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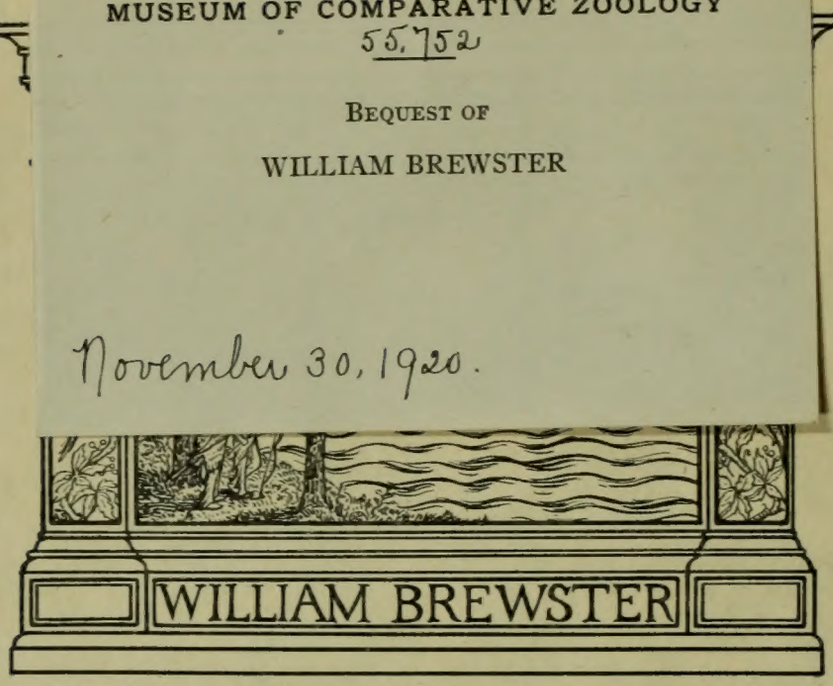

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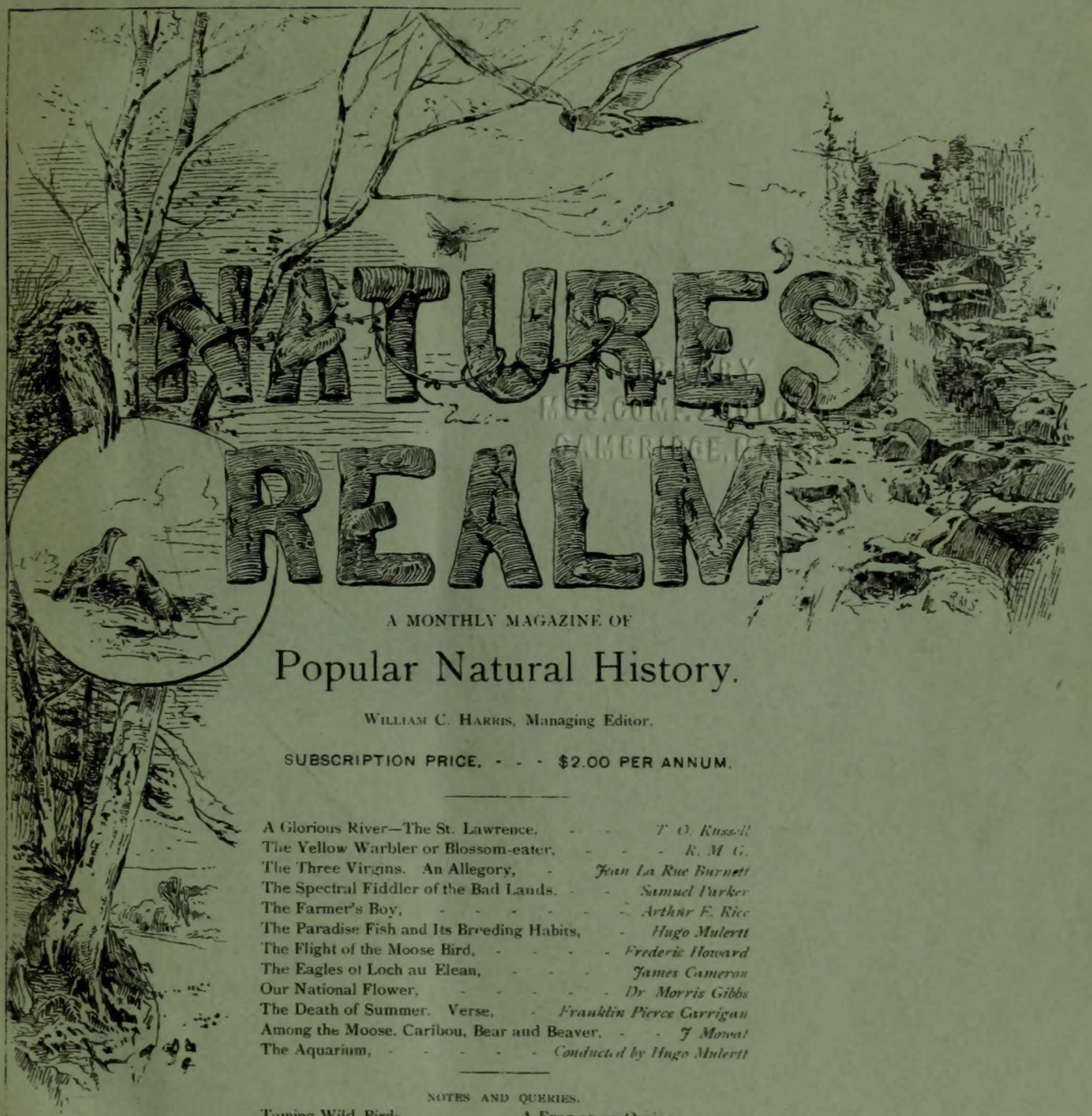
VOL. II., NO. 1. JANUARY, 1891. PRICE 20 CENTS.



NATURE'S REALM

A MONTHLY MAGAZINE OF

Popular Natural History.

WILLIAM C. HARRIS, Managing Editor.

SUBSCRIPTION PRICE, - - - $2.00 PER ANNUM.

A Glorious River—The St. Lawrence, - - *T. O. Russell*
The Yellow Warbler or Blossom-eater, - - - - *K. M. G.*
The Three Virgins. An Allegory, - *Jean La Rue Burnett*
The Spectral Fiddler of the Bad Lands. - - *Samuel Parker*
The Farmer's Boy, - - - - - - - *Arthur F. Rice*
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Nature's Realm. Verse.
A Frog on an Outing.
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Do Water Snakes Poison Fish?
Answers to Correspondents.

PUBLISHED BY

THE HARRIS PUBLISHING CO.,

10 WARREN ST., NEW YORK.

J. KLINE EMMET, JR., Pres't. H. R. HARRIS, Sec'y and Treas.

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NATURE'S REALM.

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A GLORIOUS RIVER—THE ST. LAWRENCE.

By T. O. Russell.

The St. Lawrence is certainly the most remarkable river in the world. The Amazon or the Congo may pour a larger volume of water into the ocean ; the Mississippi or the Nile may be longer, but none of those mighty streams can compare in scenic beauty with that glorious river that leaps the cataract of Niagara and forms the broad expanse of crystal water gemmed with the Thousand Isles.

The St. Lawrence is a phenomenon among rivers. No other river is fed by such gigantic lakes. No other river is so independent of the elements. It despises alike rain, snow and sunshine. Ice and wind may be said to be the only things that affect its mighty flow. Something almost as phenomenal as the St. Lawrence itself is the fact that there is so little generally known about it. It might be safely affirmed that not one per cent. of the American public are aware of the fact that among all the great rivers of the world, the St. Lawrence is the only absolutely floodless one. Such, however, is the case. The difference between high and low water in the Ohio at Cincinnati is nearly fifty feet. Even the Upper Mississsippi, placid and smooth-flowing a stream as it is, sometimes overflows the country for miles on either side of its banks. The turbulent Missouri is also subject to immense rises. Some eight years ago it very nearly drowned out the flourishing city of Council Bluffs, and, had it risen three feet more, the magnificent iron bridge that spans it, and that connects Council Bluffs with Omaha, would have only spanned a mud-hole, and the vagabond river would have carved out a new channel for itself right through the centre of Council Bluffs. Even the mighty Amazon has its rises and falls ; if its southern and northern tributaries should happen to be low, or to be high at the same time, it becomes seriously affected. Every river, in fact, on this continent, and all over the world, has great rises and falls brought about by the elements, the St. Lawrence alone excepted.

But the St. Lawrence sometimes causes terrible trouble when the waters get jammed by ice. Only a few years ago it almost drowned out Montreal and did millions of dollars' worth of damage. The flood was not caused by rain, but by an ice gorge and the peculiar character of the river at Montreal. That city is only a mile below the rapids of Lachine, and the ice in spring time is driven down the rapids at the rate of millions of tons per hour. Just below the rapids the large island of St. Helens and the small one called Isle Ronde bar the passage of the ice, and it often gets gorged in the narrow channel between Isle Ronde and the northern shore. The last time Montreal was inundated by the obstructed waters of the St. Lawrence, the ice in the narrow channel was estimated to be nearly a hundred feet in thickness. If some means are not adopted for blowing up the ice gorge with dynamite when it suddenly forms owing to a rapid breaking up of the ice above the Lachine Rapids, Montreal may some day be ruined.

The St. Lawrence despises rain and sunshine. Its greatest variation caused by drought or rain hardly ever exceeds a foot or fourteen inches. The cause of this almost everlasting sameness of volume is easily understood. The

St. Lawrence is fed by the mightiest bodies of fresh water on earth. Immense as is the volume of water it pours into the ocean, any one who has traversed all the immense lakes that feed it, and for the surplus waters of which it is the only channel to the sea, wonders that it is not even more gigantic than it is. Not one drop of the waters of the five great lakes finds its way to the ocean save through this gigantic, extraordinary and wondrously beautiful river. No wonder, then, that it should despise the rain and defy the sunshine.

The headwaters of the St. Lawrence take their rise in Minnesota and form what is known as the river St. Louis. It is a small stream, and falls into Lake Superior at Duluth. The St. Lawrence is generally thought to be a comparatively short river. This idea is by no means correct, for, measured from the headwaters of the St. Louis River to where it mingles with the ocean, the distance will be found to be little short of three thousand miles. The St. Lawrence is in reality longer than the Mississippi proper, not counting the Missouri, and there are probably not more than six rivers in the world that exceed it in length; but none of which, except the Amazon, pours more than half the volume of the St. Lawrence into the ocean. The river St. Marie, that connects Lake Superior with Lake Huron, is where the St. Lawrence next assumes the form of a river. It is here an immense volume of water, nearly a mile wide and wondrously beautiful; here tumbling over rapids and there expanding into crystal lakes. But the picturesqueness of the river St. Marie is sadly marred by a canal and by an immense lock that is said to be the largest in the world. The St. Lawrence next makes its appearance as a river at Sarnia, where it rushes out of Lake Huron—a veritable giant nearly half a mile wide, eighty feet deep and with such a rapid current that a steam-propelled craft only can breast it. Here it is called the Detroit River, and, except where it expands into Lake St. Clair, retains its river character until it is lost in Lake Erie. The scenery from Sarnia to Lake Erie, while not striking, is yet very beautiful. The waters of the St. Lawrence are here, as they are everywhere, clear as crystal, pure as nature could make them, transparent as a mirror.

When the St. Lawrence issues out of Lake Erie its real glories begin. I'll not attempt to describe Niagara. It would be folly in me, for the greatest of those who have attempted it have utterly failed. For nearly ten miles of its course above and below the cataract the St. Lawrence is the glory and the wonder of the world, with its rushing, gleaming, foaming rapids above the falls; with the falls themselves, their immensity, their thunder and their rainbows; and then the seething, swirling river below, confined in the narrow gorge into which it has leaped; shooting up in ragged masses of water twenty feet high from unfathomable abysses; plunging wildly against the rock-barriers out of which its own maddened waves have cut a channel; careening round and round in the whirlpool; gradually subsiding, and at last flowing into Lake Ontario without a ripple.

After the glory of Niagara comes the glory of the Thousand Isles. Very different indeed are they from Niagara; but the Thousand Isles are as unrivalled in their own way as Niagara. There is nothing like them in the world, so far as it has been explored. The Thousand Isles want but one thing to make them as nearly heavenly as it would be possible for anything earthly to be, and that is mountain scenery. Of this they have none. The Canadian side of the river is, however, at one place very steep, forming most picturesque cliffs covered with green trees of unnumbered species. But the Isles themselves are the wonders of the scene. There are a great many more than a thousand—sixteen hundred and ninety-two, according to the most reliable count. Some contain thousands of acres; some are no bigger than a tea-table. The biggest and the least of them are beautiful. All are covered with shrubs or something green, and all are surrounded by water so clear, so wonderfully pure, as can be found in no river save in the St. Lawrence. This purity of water is one of the great charms of this glorious river. If the Thousand Isles were in the Ohio or Missouri they would lose most of their charms, for the waters of those

rivers are the color of pea soup during nine months of every year. The same cause that makes the St. Lawrence floodless makes its waters pure; the great lakes that feed it absorb any sediment washed into their waters; they are alike its parents and its purifiers.

The sail down the St. Lawrence from Kingston to Montreal is the most extraordinary and exciting river journey in the world. The scenery of the Hudson is certainly finer than that of the St. Lawrence; but the Hudson, glorious as it is, is only an estuary. Its banks are beautiful but its waters are sluggish. If the St. Lawrence had the mountain scenery of the Hudson, its fame would reach the ends of the earth. But in sailing down the St. Lawrence from Kingston to Montreal, one's whole attention is taken up with the river itself. There is no time to gaze around, for soon after the boat leaves the mazes of the Thousand Isles the rapids begin. Any sensation more delightful than being carried along at the rate of fifteen miles an hour by rushing waters it would be impossible to imagine. If mountains were piled on mountains on either side, not one in fifty would care to look at them while shooting the Cascade, Long Sault or the Lachine Rapids; and it must be borne in mind that the greater part of the sail from the Thousand Islands to Montreal is through rapids more or less swift. No passenger, not even the most timid, feels any nervousness in shooting through the Cascade or Long Sault Rapids. On approaching Montreal, however, the greatest rapids on the river, those of Lachine, are encountered. To stand on the bank of the river and gaze across more than a mile wide of rushing, roaring waters, leaping and tumbling over the "precipitous black jagged rocks" that rise here and there out of the foam, one would imagine that to take a great steamboat drawing six or eight feet of water down such a cataract would be certain destruction both to passengers and craft. But such is the immensity of the volume of water that there is very little danger. No serious accident has ever occurred to a steamboat going down the Lachine Rapids. It must, however, be confessed that many a brave man has turned pale where, in one place, the boat has to take a plunge of six or seven feet perpendicular. In less than ten minutes after the boat takes the big leap she is in the harbor of Montreal and has no more rapids to shoot.

The voyage from Kingston to Montreal is made in a day. The boats leave Kingston early in the morning in order to make the entire trip by daylight; this they always do, although the distance is 198 miles. The boats are not nearly so large as those in the Hudson, but they are as safe and commodious as care and skill could make them. To those who want to take the most beautiful as well as the most curious trip perhaps on this continent, and to any one who wants to experience a new sensation of the most delightful kind, I would say, "Shoot the rapids of the St. Lawrence."

From Montreal to Quebec the St. Lawrence is very unpicturesque; it is too big to be beautiful, and is more like a great arm of the sea than a river. As Quebec is approached, the scenery becomes of great interest, especially from a historic point of view. The river narrows to less than a mile in width, and Quebec, the great fortress of not only the St. Lawrence, but of half the continent, is seen towering on an apparently perpendicular rock some hundreds of feet over the narrow water-way it effectually guards. It was near here that the fate of half a continent was decided a hundred and thirty-one years ago in the memorable battle of the plains of Abraham, by which France lost the noblest of all her colonial possessions. Below Quebec the St. Lawrence becomes a sea, and is so wide that it entirely loses its river character. But the lower river possesses one point of wonderful beauty and sublimity, that is the embouchure of the mighty Saguenay. This river joins the St. Lawrence a hundred and fifteen miles below Quebec, and between two giant headlands called Cape Eternity and Cape Trinity. The scenery of the Saguenay is of the grandest and sublimest kind, but could hardly be described in connection with that of the St. Lawrence. The Saguenay, like the mighty stream into which it flows, may be counted among the remarkable rivers of this continent, and is well worthy of a separate article.

Ere closing this short description of one of the mightiest and certainly the most remarka-

ble river on earth, it might not be out of place to supplement it with the following

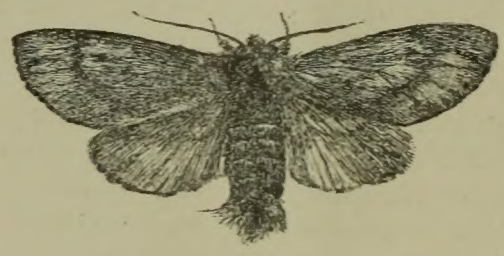
HYMN TO THE ST. LAWRENCE.

Methinks there's naught on earth more beautiful
Than the wild rush of some broad, glittering river.
Rivers there are of dull and silent flow
That wake no joyous feelings in the soul;
But thou, O glorious, sparkling, crystal stream,
Art full of life, of laughter and of song—
A joy to man, a blessing to the earth!
From where thou rusheth out of Huron's breast
To where thy mighty tribute meets the sea,
Thou'rt ever beautiful; e'en where thou puttest on
Thy sternest aspect, and with mighty bound
Hurlest thyself in thunder and in foam
Down broad Niagara's tremendous steep,
Thou still art beautiful, and hid'st thy wrath
Behind a cloud of silver and of gold
And robest thyself in rainbows; beautiful
In lake, or fall, or rushing cataract,
Our noblest river and our fairest, thou!

Many the mighty streams that wend their way
O'er this vast continent from sea to sea,
Whose wasting waters shrink 'neath summer suns
Till they become mere mockeries of rivers;
But thou defiest the elements; rains may fall,
And creeping rills may swell to cataracts,
But thou remainest unchanged; thou art so broad.
So deep and mighty that thou dost disdain
The petty tribute sent thee from the clouds.
Scorner of the bright sun also art thou;
His angry beams may beat upon thy breast—
For days unnumbered no small, fleecy cloud
May mar the fierceness of his burning rays
That shrink up mighty rivers into rills;
But thou defiest alike the summer suns
And torrents of the autumn or the spring.
Thou drawest thy strength not from the clouds of heaven,
For all the waters of vast inland seas
Pour themselves oceanward through thee,
Disdainer of the sunshine and the rain!

Emblem of purity and strength art thou
Beyond all other rivers of the earth;
Thou'rt unpolluted and pollutest not;
Thou art too mighty to be marred by man.
He raises stately cities on thy shores,
And on the lakes that feed thy giant flood,
But thou remain'st unsullied; thy blue waves
Sparkling and bright in crystal purity
Roll gleaming on amid the Thousand Isles,
And down the laughing rapids to the sea,
Pure as when first the sunlight kissed thy face,
And lit thy beauties for a voiceless world.

With all the beauties of thy bosky isles,
With all the wonders of thy thund'ring falls,
With all that loveliness supreme of thine
That crowns thee king of rivers, thine own sons
Are but half-hearted in their love of thee;
They turn from thee in coldness and disdain
To gaze upon some old-world tiny stream
Richer than thou in legend and in song.
But fear not, river of unshrinking wave
And scorner of the elements! thy fame
Shall yet be spread abroad o'er all the earth,
And men will leave their homes in far-off lands,
Will turn their backs on Europe's storied streams—
Their ruined strongholds of grim robber kings,
Their dark mementos of a feudal past,
To worship at thy shrine where all are free.



THE YELLOW WARBLER OR BLOSSOM-EATER.

By R. M. G.

There are few indeed who may be considered lovers of our feathered friends unfamiliar with the vivacious song of the yellow warbler. The air is full of the joyous notes of myriads of happy songsters, and a practiced ear can readily detect the ditties of twenty well-known species in the grove near at hand, while the willow copse at the edges of the stream adds its quota of harmony to the May-day chorus. Swaying on the topmost spray of the budding pussy willow near may be seen the blue-eyed yellow warbler, an active little fellow dressed in a bright coat of chrome yellow with a tinge of greenish. His breast is streaked with burnt umber, while his eye, characteristic of the species and a peculiarity in coloration in birds, is light blue. His song floats to us almost uninterruptedly, though after the first burst seeming to come from a different source. The gay, suspicious creature is shy, easily made anxious by our presence in its chosen haunts, and is flying about us from bush to bush intent on a tour of inspection. Down among the trees and bushes bordering the brook and river his thrilling notes can be heard all the day long from early May until middle of June. Unlike many of our common birds, he does not cease to sing when the sun is high in the heavens, but rather increases his bursts of liquid melody during the warmer hours in seeming rivalry to the red-eyed vireos of the grove, chanting their praise in the spotted shade formed by the partially foliaged elms and basswoods.

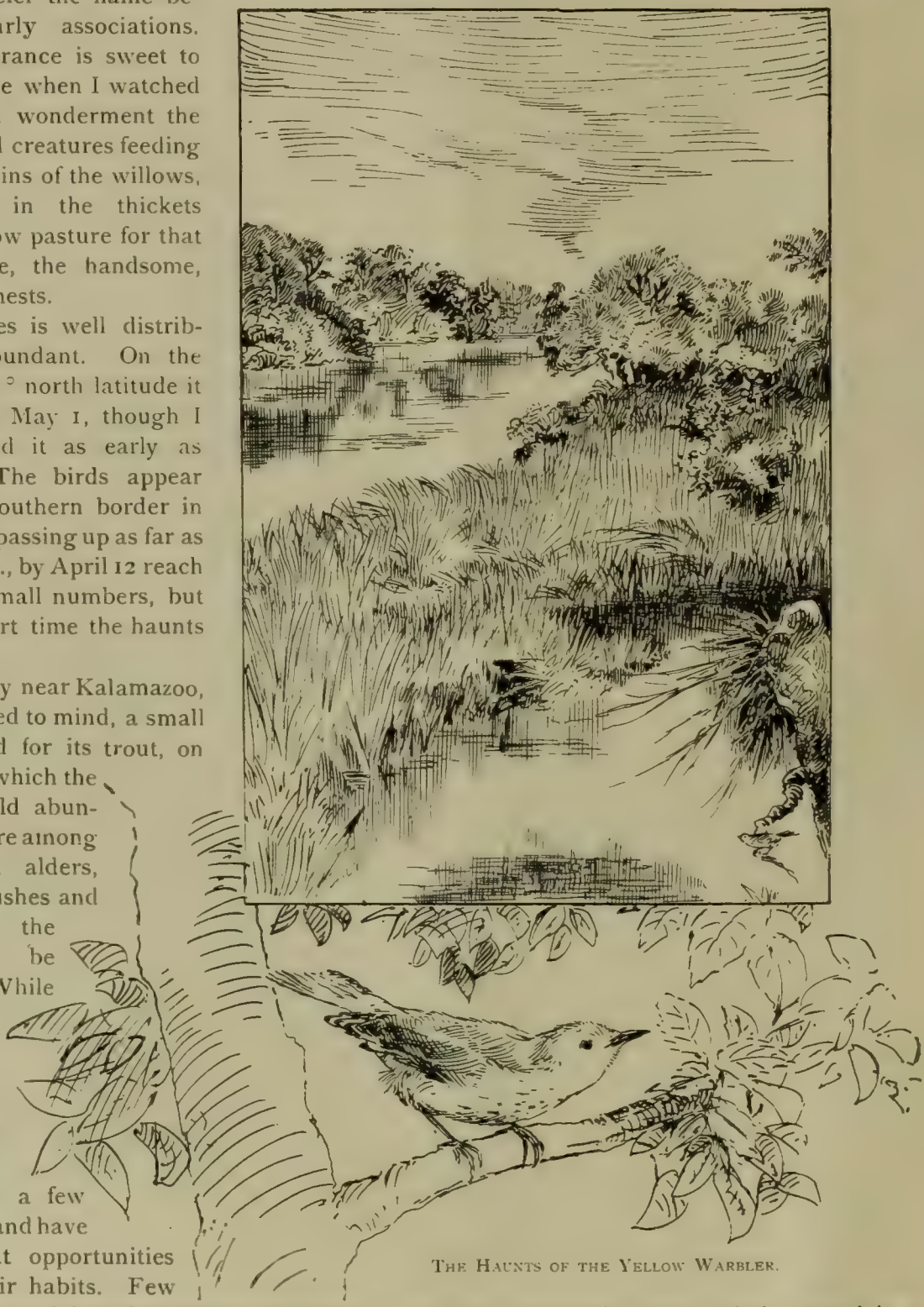
The song of this species is thrilling in its sweetness, and, though not long, it compensates for its brevity in vivacity. I know nothing more agreeable or inspiriting than the notes of this bird issuing from a copse in early morning when the sun has lent his beams and the dew still glitters on the early foliage of the willows. The summer yellow bird, as it is often called, is one of the first to make its presence known in the morning, and they are often heard while still the whippoorwill is monotonously quavering his jargon and the noiseless bats are wheeling above in murky air. The simple song, but doubly sweet at this time, sounds almost out of place while yet the owl is lurking for his prey, but is always agreeable to one who, from choice or duty, goes abroad at this hour. We cannot claim superiority for the notes of this pleasing performer of the bush from any elegance of modulation, as it is outranked by many in true merit as to music. The soft-toned song of the scarlet tanager and bell-like notes of the wood thrush, or the rippling warble of the warbling vireo, are perhaps more truly musical, but they do not more perfectly fill their part in the chorus than do the ecstatic notes of this warbler, whose cheerful song possesses an inspiriting power to a remarkable degree. One who hears the cheerful song will ever remember it if he has an ear for harmony and a love for birds. I shall not attempt a description of this song, for, although some songs are uttered so plainly in distinct syllables, as we may say, as to even be set to music, most series of notes are beyond description. If we assert that the songs of birds which are the most difficult to describe are the most beautiful, we shall be correct. The true music issuing from the throats of most feathered singers is above comparison or criticism.

One cannot fail to have favorites, and our selection is unconsciously made even with the birds. We look upon some as our sentimental friends, as we would hold a musician or poet; again we compare those of chivalric tendencies and yet again those of vulgar characteristics and flashy appearance, or of manners arrogant or unconscionable. Our little friend under discussion is certainly a favorite, and as thoroughly knitted to our sympathies as it is possible to ally one of these winged gems with our human sentiments. To me this bird will ever be cherished in my heart of hearts. Years ago, when the advantages afforded by works on ornithology were unknown to me; at a time when names of many—nay, nearly all—of our feathered friends were catalogued in my mem-

ory by names of my own coinage, this species was denominated the blossom-eater, and to this day I prefer the name because of early associations. The remembrance is sweet to me of the time when I watched with childish wonderment the trim, graceful creatures feeding from the catkins of the willows, or searched in the thickets around the cow pasture for that rarity to me, the handsome, well-formed nests.

This species is well distributed and abundant. On the parallel of 42° north latitude it arrives about May 1, though I have observed it as early as April 19. The birds appear first on our southern border in March, and, passing up as far as St. Louis, Mo., by April 12 reach us, first in small numbers, but within a short time the haunts are filled.

One locality near Kalamazoo, Mich., is called to mind, a small stream noted for its trout, on the banks of which the warblers build abundantly. There among the willows, alders, elderberry bushes and small trees the habits may be studied. While silently fishing I have frequently observed these little yellow meteors within a few yards of me, and have had excellent opportunities to notice their habits. Few of us are aware of the advantages of occasionally sitting in some secluded place in wood or field and awaiting developments. It is not best to dash through forests and clearings; in fact it is never the correct way for collecting or observing nature. Some of my best discoveries have been made when quietly seated in a retired spot, even watching a familiar bird.



THE HAUNTS OF THE YELLOW WARBLER.

The yellow warbler, when unsuspicious, a condition which obtains in a short time, pro-

vided we remain quiet after entering his haunts, has many interesting traits unobserved by those who idly pass. He is a veritable acrobat, and will hang head downward and then assume the upright position without apparent effort. He rolls and circles around a twig much more easily than the most accomplished performer on a bar, and infinitely quicker. Our performer is so vivacious and erratic that it is impossible to tell what act this agile bird will do next as we watch his movements. Skipping from twig to twig, now flying from bush to bush, again hanging head downward from the end of a swaying branch, and ever uttering its vivacious notes, of which it has two series, it is ever pleasing to the eye and ear. Soon after arriving the birds may be seen chasing one another, and many are mated within a week after the arrival of the females, which appear a few days later than the males. The battles between the birds during the first half of May are very amusing, at least to the spectator. It is fair to judge that new mates are chosen each season, although this is contrary to the theories of some observers of our song birds, who claim that birds of this class are constant. At least bird battles do occur among the yellow warblers, as with all our singers each season, as if at least to hold their claims good in the interest of old mates.

After mating has taken place the pair look for a suitable nesting place. The nest is usually begun by May 15, but often earlier. The nest is almost invariably placed in a bush. A wild rose is selected, alder, hazel, or, more rarely, a willow or thorn. Nests are occasionally taken in gardens and orchards, when an apple, plum tree or current bush is chosen. Nesting sites are, however, usually near the courses of streams. The structure is generally placed from four to ten feet high, rarely at a greater altitude. The net is an exceedingly neat affair and is rarely surpassed by the nests of any of our species—noted for artistic form and neatness. It is usually situated in a fork in a small bush, and is so interlaced with the twigs forming its support as to be sometimes detached from its lodgment with great difficulty. The twigs bearing leaves usually at the time when the young appear, look as if they grew through or from the nest, giving the structure an odd appearance. Externally the nest is composed of a substance resembling tow in consistence and of a grayish color when seen from a distance. The material is tenacious and disposed in circular layers. The lining is composed of a variety of softer materials, among which is the downy portions of catkins, making a soft bed for the eggs. Occasionally a pink-colored cottony substance is added both outside and in. It is appropriated from the ferns and adds a pleasing variety in coloration to the nest.

The summer yellow bird has a decided peculiarity in leaving its nest for some time after its completion and before laying its eggs. It is possible that the pair want to discover the nature of the neighbors, and are waiting to satisfy themselves of the desirability of the chosen site. Be that as it may, they often make a mistake, and, in their anxiety, frequently encounter difficulties from which they only extricate themselves at great pains.

The cow bird, that socially low bird of most immoral views, is ever on the alert for a nest of the absent warbler, and, in her anxiety (cuckoo-like) to cast her offspring on to the fostering care of the poor overburdened house holders, not rarely overdoes the matter, and the eggs are deposited long before the rightful owner is ready to begin housekeeping, or deposits their hopes of future posterity in too great numbers along with the eggs of the warbler, much to the indignation of the legitimate property claimants. Perhaps no bird is so abused as the little yellow warbler by the now considered polygamous cow bird, and it is safe and agreeable to say that no species exhibits greater spirit or ingenuity in maintaining its rights and circumventing the would-be despoiler of its home. The pair do not consider these immoral plebians as their neighbors, but view them as interlopers and social vampires, and will not vacate the premises, or at least but rarely, for the prospective aliens. With great determination the warblers begin a second nest directly above or literally on the first nest, and in a short time entirely cover the objectionable egg or eggs of the detested cow bird, after which the eggs of the legitimate nest builders are deposited in the upper n

NEST OF THE YELLOW WARBLER, SHOWING TIERS OF EGGS.

Sometimes one or more eggs of the warbler are sacrificed with the hated aliens, such is the detestation of these birds toward the interlopers.

Several structures now before me exhibit the architectural skill displayed by these thoughtful birds in thus relieving themselves of an unsolicited addition to their family. As many as one nest in fifteen is thus built in order to entomb the objectionable eggs, and the incubus is a second time resisted in one instance, to my knowledge, thereby presenting the decidedly unusual condition, even in this anomalous relation, of a three-storied nest. During the early part of the construction a foolish cow bird, anticipating rather prematurely, laid an egg. This was soon covered and the nest finished. Two eggs were then deposited to the credit of the happy warblers ere they were again cruelly imposed upon. Thinking that the neighborhood was moral and that nothing would occur to harm their house at the side of the road, the pair flitted about in their happiness and innocence of ill, little suspecting the designs of two crafty, dusky cow birds, which had skulked about for several days. Alas! when the joyous warblers returned they were greeted with the sight of two speckled eggs twice as large as their own, which were crowded out of place. After this imposition the determined pair, probably from former years' experience, immediately began a second time to evade the encroachments of the spoliators. Without hesitation they immediately inhumed their own eggs with the unsought additions. When discovered their work of love had advanced to that stage where the remainder of the clutch of eggs reposed in the upper story or nest of this remarkable structure. The three eggs in the upper or nest proper were advanced in incubation, while the four eggs in the second story and one in the lower were still fresh, but doomed to destruction from their position and the want of heat only supplied by the bird's body.

In those cases where the eggs of the cow bird are hatched the old yellow warblers, owners of the nest, are kind and attentive to the young aliens. The fond pair, though forced in their adoption, are generally devoted to these perfidious children of fate up to the time of their departure from their alien home.

As late summer draws on the handsome yellow warbler is more rarely seen and heard, the little fellow keeping himself concealed in the low bushes about the streams, occasionally enlivening the scene by flitting through one of the vistas of the willow copse, when it will be noticed that his plumage, after the recent moulting, is not so bright as in early summer. As the golden rod rears its golden racemes to our view in the rank grass at the roadside the warbler becomes scarcer, and, by the time that the pleasing autumn flowers are in their glory, the little yellow meteors have all left us for their seven to eight months' vacation in the sunny south.

A TRUE GLACIER IN MEXICO.

Prof. Heilprin's party, who have been exploring in Mexico and Yucatan for four months past, under the direction of the Philadelphia Academy of Sciences, has recently returned chock full of delightful success and new information in all departments of natural history. On Mount Ixtaccihuatl, which is the third highest mountain in Mexico, was found a true glacier. Although the wreck of a true volcano it no longer presents the form of a symmetrical volcanic cone, but exhibits a long broken crest upon which snow and ice have accumulated to a thickness of from 75 to 100 feet. Enormous crevasses traverse this ice in all directions and make the ascent in combination with the very deep slope of the mountain, one of great difficulty and no inconsiderable danger. The ice is, in fact, a new moving glacier, and presents all the features which distinguish the glaciers of the Alps. It has been supposed hitherto that glaciers were completely wanting in Mexico.

THE THREE VIRGINS.

AN ALLEGORY.

By Jean La Rue Burnett.

Three virgin sisters met at close of day
Upon a cross-road in life's weary way
Called Maidenhood, and while they pause to greet,
It chanced an aged hag with sable dress
Came weeping bitterly as in distress
A-down the thorny road with blood-stained feet.

"Prithee, good mother," did the virgins cry,
The while the senile dame went hobbling by,
"Pause thou with us and rest thyself awhile;
Thy limbs are weary, sorrow-stained thy face—
Pause, for there is no other resting place
Save this, for many a long and dreary mile."

The travailed woman turned her snow-white head,
Bow'd with the bitterness of years long dead,
Her voice rang hollow through the twilight gloom:
"My name is Age," saith she, "I know no rest!
The wizard Time hath willed a fruitless quest
To be my hapless lot until the tomb."

"What seeketh thou, Dame Age?" one virgin cried,
"Tell us thy quest; perchance our aid may guide
Thee to the Mecca of thy life's desire."
"Alack! my child, I once was young like thee;
Then had I that which now I seek," quoth she;
"Nor prized it—lost 'tis hopeless to acquire!"

"It is a gem of priceless worth called 'Joy,'
The which no god hath power to destroy:
As crystal pure—no jewel quite so rare!
There is a certain youth who hath this gem
With others compassed in a diadem;
Love is his name, so young is he and fair."

"His eyes are blue, and golden is his hair,
Bold is his heart and soft and debonnair;
He rides a fiery steed whose name is Pride—
Betide he wandered forth this gladsome day;
Saw you him pass along this weary way?"
"Alas! we saw him not," the maidens cried.

"Pray tell us, aged mother, how can we
Find this sweet youth, and we will seek with thee,
For we would have this wondrous gem," cried they.
"Search long and faithfully," exclaimed the dame,
"And when you find him whisper low your name!"—
And on the morrow each one went her way.

* * * * * *

The years sped by.
It chanced one boist'rous winter day,
With sorrow's storms and cold beset,
On Middle Age, life's roughest way,
Again this virgin trio met.

I.

And she whose name was Beauty came ahead,
As one who, weeping, mourneth for the dead :
Her brow was wrinkled and her pallid face
Had lost the sweetness of its youth-tide grace.
Bow'd was her head and icy-cold her breath,
Her lips blue with the chill of coming death.
" Thrice 'round the weary world I've been," said she ;
" I've braved the storms and tides of sorrow's sea,
I've faced the pangs and bitterness of Care
To seek this wondrous jewel everywhere ;
Once saw I this sweet youth, and as he came
I whispered in his yearning ear my name.
Alas ! he lingered by me but a day,
Then on his snow-white charger dashed away."

II.

Next she whose name was Fortune forward came,
With head bent down as if with care and shame.
She walked with feeble footsteps weak and slow ;
Her raven locks turned white by winter's snow,
The erstwhile pureness of her marble brow
Rude care had mocked with Sorrow's footprints now,
And faithless Time had left no single trace
To mark the vigor of her virgin grace.
" Long have I sought this gem," she weeping said,
" In lands of Living and in lands of Dead ;
Once I too saw this youth, and as he came
I shouted proudly forth my glorious name :
I saw him turn his god-like head and sigh
As on his snowy steed he hastened by."

III.

Then she whose name was Trust came down the way,
Burst from her lips a flood of melody,
The while the coldness of the snow-bound air
Seemed changed to honeyed fragrance rich and rare.
Her dancing feet sped o'er the chilly ground,
Weird echo-music floated all around,
And deep within her eyes a hidden light
Beamed with a soft effulgence, ever bright.
The mellow accents of her voice rang clear
And echoed from the hilltops far and near :
" I too saw this fair youth, and as he came
I spoke with trembling lips my humble name,
Then at my feet he cast his diadem—
Lo ! gentle sisters, I have brought the gem."

THE SPECTRAL FIDDLER OF THE BAD LANDS.

By Samuel Parker.

Four days of wandering through the Bad Lands of Dakota had been so fruitful in the discovering of fossil remains, etc., imbedded among the hills, that I had decided to remain at least a fortnight. My camp supply of food having become almost exhausted, Felix, my half-breed guide, had started with the ponies and wagon for the post, distant about thirty miles, for the purpose of obtaining supplies for our larder. The distance, and the rough condition of the wagon trail rendered it impossible for him to return to camp until noon the following day. Shortly after his departure in the morning, with a few biscuits in my pouch and a small flask of water, I set out on one of my accustomed rambles. It was one of those calm, delightful days which characterize this wild latitude in autumn. The silent hills, reposing about me in weird and lonely grandeur, with their sleeping outlines almost invisible through the dense blue haze of Indian Summer, resembled the hills of some ghostly land.

Over this desolate region, which was known by the early French Canadian voyageurs as La Mauvaise Terre (the Bad Lands) there broods an eternal silence, as deep and awful as that which reigned over the primeval chaos, ere animated nature became vocal under the smile of God. The fantastic mounds, rock-strewn, and the beetling crags, deluged with the rains of centuries, are voiceless memorials, marking an epoch in the world's history when the entire locality was submerged by the billows of a vast inland sea.

Clasped within the embrace of the massive upheavals of chalk and limestone are the entombed remains of birds, reptiles and animals of the pre-historic age—a period so dim and shadowy, and so remote withal, that its very contemplation is appalling to our finite minds.

Before leaving camp in the morning I resolved to devote the entire day to my researches, and my route had taken me into a locality more strikingly savage and magnificent in scenic grandeur than any which I had hitherto explored. The rugged summits of the precipitous cliffs, rising to a height of from two to three hundred feet, with their craggy outlines silhouetted against the sky, assumed a weird variety of monumental forms. Posing dreamily on their lofty pedestals, and vaguely defined through the smoky haze, were Indian warriors seated calmly on their horses; Mohammedan mosques with their slender minarets; gigantic dragons harnessed to Roman chariots; huge couchant animals with sphinx-like features, conspicuous among which was the colossal canine figure known to scientific explorers in these wilds as "the watch-dog of the Bad Lands."

In the midst of scenery so spectral and uncanny my sensations were eerie in the extreme. An undercurrent of dread, a strange haunting presentiment of some impending calamity, seemed to possess me, which the tomb-like quiet of the place served but to intensify.

Hitherto in my rambles I had been accompanied by my guide, whose voluble flow of broken French, interspersed with an occasional song, had given me no opportunity of noting the dreadful silence that reigns over the Bad Lands.

A man lost amid these deathlike solitudes soon becomes frenzied with a terror so wild and despairing that he breaks down, sobs and cries like a hysterical child. The profound and ominous silence, and the deplorable desolation of his surroundings, inspire him with a dread that is absolutely appalling. Does he shout, a hundred jeering and derisive echoes respond to his piteous appeal from their ambush among the lonely rocks. Crazed with the delirium of thirst, after hours of erratic wanderings through the parched alkaline air, mayhap he emerges from the hills to the long, level sweep of plains beyond. Then, perchance, there bursts upon his eager sight a vision that sends a thrill of gladness through his every vein. A mile away, and wavering and shimmering through the tremulous air, is the waters of a delightful lake, the cool, refreshing billows of which are heaving peacefully in the fervid glare of the noonday sun.

But the fabled music of the sirens that de-

coyed the sailors to their doom was no more deceitful than this island-dotted lake, which the deluded wanderer, with staggering footsteps, is vainly striving to approach. The grove-encircled lake with its wave-kissed ledges and its delicious tree-shadowed islands, is the mocking mirage—that elusive phantom which floats spectre-like over the desert plains as does the shadow of a drifting cloud.

Long before the evening shadows have lengthened across the thankless plains the tempting vision of water, islands and rocky ledges, like a will-o'-the-wisp of the swamps, has faded silently from view, leaving the unhappy victim to sink exhausted and dying upon the desert, a feast for the wolves and vultures.

The farewell kisses of the setting sun were suffusing the brows of the purple hills with deep vermilion blushes, and the ravens were returning to their haunts of repose among the sheltering ledges, when I abandoned my relic-hunting for the day and set out on my return trip to camp.

After proceeding for a mile or so along the dry bed of a torrent the trail suddenly diverged to the right and entered a cañon, the steep, perpendicular walls of which the long-continued erosion of the elements had transformed into a strange resemblance to the ruins of an ancient city. Indeed, so perfect was the architectural resemblance of what appeared to be a stately cathedral, that, had the solemn chant of the *te deum* floated from the ruined doorway, or the soft, exalted sound of a bell from the crumbling tower been wafted to my ears, the illusion would have been complete.

Whilst hastening along through the fast fading twilight my ears were occasionally saluted with the dismal and satanic howl of a solitary wolf, just emerged from its lair in some gloomy cañon, and hailing the approaching advent of the congenial darkness with yells of melancholy rapture. These lonely domains are infested with many species of wild beasts, which begin their prowlings at nightfall, and it was when I espied a dark object cross the trail a short distance beyond me and disappear in the dusky gloom, that I began to reflect upon the danger of being thus alone at night in the Bad Lands; for, with the exception of my hunting knife, which I carried in my belt, my weapons consisted of nothing but a light fowling piece belonging to my guide, and in a possible encounter with a bear or mountain lion my attempts at defense could only have resulted in disaster. However, I soon arrived safely at camp, and, replenishing the yet smouldering fire with an armful of sage shrubs, I prepared my supper of coffee, biscuits and a portion of grouse left over from my noonday meal.

At the conclusion of my lonely repast, while arranging the cooking utensils on a low, flat rock, over which Felix, previous to his departure, had spread a blanket and disposed thereon such articles belonging to our camp paraphernalia not required on his journey, I perceived that he had also left behind his violin—an instrument, by the way, which he touched so abominably that, in order to avoid distraction, I had thus far bribed him liberally to refrain from vexing my ears with any of his discordant melodies.

Being somewhat fatigued after my day's tramp, I placed a fresh supply of sticks on my fire, and, having arranged my couch of buffalo robes and blankets, I turned in for the night.

The moon was appearing above the horizon, and its lambent glare invested the wild panorama of surrounding hills with an imposing and supernatural glory, and, to further enhance the sense of loneliness and isolation which all day long had haunted me like an incubus, one of those sudden breezes peculiar to the country had now risen and was sweeping disconsolately through the caverned ledges, grieving and lamenting like a banshee.

From the hour when I retired until far into the night my slumbers were uneasy and fitful. I was somehow oppressed with an unaccountable apprehension that I was not alone in my solitary camp in the Bad Lands—that somewhere amid the hovering shadows there lurked a presence, but whether human or fiend I was unable to comprehend. Years of experience by lonely camp-fires in the wilderness had rendered my hearing faculties so acute that even the stealthy tread of a moccasined Indian would scarcely have escaped detection.

However, in my waking moments the brooding wilderness' hush was broken only by the

baneful howling of the wolves and the voice of the night wind, the hysterical raving of which was degenerating into weird and gasping whispers.

About midnight I was aroused from a transient doze by what appeared to be the twanging intonations with which the players on stringed instruments usually prelude their performances. Glancing in the direction from whence the sounds proceeded, I was amazed at beholding a skeleton seated on the rock containing our camp fixtures and holding in its bony hands the violin before mentioned, which the ghostly visitor was apparently in the act of tuning. Holding the violin in an upright position on its knee the grizzly phantom executed the various manipulations necessary to bring the instrument into proper condition with such a remarkable fidelity to life as rendered me spellbound with astonishment and terror.

From its position on the rock the face of the skeleton was turned directly toward me, and in the wan and pallid glare of the moonlight the rows of grinning teeth and the wild and vacant stare from the cavernous eye-sockets presented a spectacle so full of horror that, unable longer to endure the frightful presence, I resolved upon its immediate annihilation. Seizing the gun which I had placed by my side on retiring, I discharged the contents of both barrels into the body of the hideous intruder, fully expecting to behold the creature's anatomy fall into a heap of disjointed fragments upon the rock. But as well might my artillery have been directed against the moon. My first glance of fearful apprehension when the smoke had cleared sufficiently, revealed the skeleton seated composedly in its original position, and with the air of a practiced connoisseur in the line of harmony, completing the process of putting the chords of the violin into playing condition—a task which appeared to be well-nigh accomplished. Trembling with agitation I raised my fire-arm for another shot, but reflecting on the futility of any attempt to bag a creature of so immaterial a structure, and through the chinks of whose framework the background of stars was visible, I lowered the weapon, and, cowering back among the blankets, endeavored to persuade myself that the ghastly memorial of mortality seated on the rock was a mere phantasm—an optical illusion engendered by a disturbed imagination.

My ingenious theory, however, was promptly dispelled, for at this juncture I perceived that the ghostly minstrel was about to play. Moreover, it required but the first few preliminary strains which were evoked from the soul of the instrument with a long-drawn and resonant sweetness, to persuade me that a master hand had touched the strings.

The first production was of the nature of a hornpipe, in the performance of which the skeleton bent itself with such terrific energy that both heaven and earth seemed to reel in ecstatic accompaniment. Variation succeeded variation, with a rapture so exquisite and thrilling that the element of horror which had pervaded every fibre of my being at the outset was converted into wonder and admiration.

To this superb introductory effort I was minded to demand an encore, but ere the last note of the extraordinary rhapsody had been sounded, the spectre, as if for the purpose of demonstrating the versatility of its powers, drifted at once into a cadence as thrillingly soft and wailing as a Moravian dirge. A pathos as yearning and impassioned as the lamentations of Andromache at the tomb of Hector quavered and mourned on the complaining chords and burdened the midnight solitudes around with all the ecstacy of woe.

Strange as it may appear, I now reproached myself for the hostile reception that I had accorded this accomplished phantom which was so graciously enlivening the dreariness of my camp with soul-inspiring melody. Although the previous experiments with my fowling-piece had given ample proof of the spectre's insensibility to external surroundings, I nevertheless resolved to henceforth observe the utmost circumspection regarding my movements, lest some unseemly demonstration should tend to hasten the departure of the gentle wanderer, thereby depriving me of such a feast of harmony as mortal ears are rarely permitted to enjoy. But unfortunately, during a temporary suspension of the music and while disposing a portion of my blankets in such a manner as to admit of a more comfortable posture, an event

occurred that threatened to precipitate the very catastrophe which I was so anxious to avert. For I had barely ceased congratulating myself on having performed the task so guardedly, when my ears were assailed by the spiteful and nerve-paralyzing rasp of an angry rattlesnake, which the skeleton's plaintive music had enticed from its den among the rocks, and which, doubtless surmising that the concert was ended, was in the act of retiring, but, finding its progress opposed by my extended form, had suddenly thrown itself into coil and sounded that peculiar blast of warning which precedes the deadly stroke. The imminent peril that menaced me demanded immediate action, and once more the loud report of my gun startled the silent wilderness into a multitude of crashing echoes, the weapon's entire charge passing through the convoluted folds of the loathsome reptile and reducing it to a mutilated mass of writhing fragments. At the close of this transient reign of confusion, however, I observed that the skeleton's equilibrium was still unruffled. Indeed, a furious break-down, which had doubtless been started at the height of the uproar occasioned by the dispatching of the serpent, had just concluded, with a flourish worthy of a Bull or Paganini, and the exacting nicety of the preluding during the brief respite that followed betokened the forthcoming of a more elaborate effort.

I now perceived for the first time that the apparition had discovered and likewise appropriated my eye-glasses, which, adjusted before the unsightly port-holes in its skull, tended little to either soften its cadaverous physiognomy or to impart an air of becoming dignity to the wearer.

But the demonstrations of mirth to which I was about giving way at the skeleton's unique appearance were restrained, for, the music being again resumed, the pleasant midnight air was pulsing with the melancholy grandeur of Beethoven's moonlight sonata. The burden of this incomparable melody was so love-lorn and despairing, so appealingly tender and heart-breaking in its emotional sweetness and softness, that a deep, delicious swoon of rapture overcame me; my senses floated away into dreamland and I heard no more.

So potent, indeed, had been the spell thrown over me by the spectral serenade, that when I awoke late the following morning my spirits were yet drowsed with a dreamy and haunting sensation of exquisite languor. The singular and ethereal sublimity of the music discoursed by the skeleton had transported me in fancy to a realm so exalted that, to the peculiar desolation of my actual environments, I reconciled myself with the most profound regret.

My scientific researches in the Bad Lands had thus far been exceedingly prolific. Among a variety of reptilean specimens I had exhumed a monster turtle, which had doubtless flourished and finally passed into its everlasting sleep ages before the green bowers of Eden were awakened with the morning hymn of Adam.

The sun had well nigh reached the meridian when my guide put in appearance, bringing a goodly supply of provender for ourselves and ponies. The latter being somewhat jaded, the poor beasts, after devouring their allowance of grain, were tethered in a little glade near our camp where the grass was most abundant.

While partaking of our midday meal I proceeded to regale my guide with an account of the skeleton visitor at our camp at the solemn hour of midnight. But before the recital was ended I perceived that I had fallen into an error sufficiently serious to preclude the possibility of prolonging my stay another night in the Bad Lands. To my intense vexation I discovered that my story of the phantom had enkindled all the superstition n his semi-Indian nature, for, in common with his savage ancestors, he had inherited the belief that the lonely fastnesses of the Bad Lands were the abode of all the demons known to their mythology. Hastily concluding his repast he announced his intention to decamp, avowing in his unheard-of trepidation that if we remained the Wakan-we-Chash-e (the Sioux for "Spirit Man") would surely reappear at midnight with a ghostly band of followers, and, after charming us into a state of helpless insensibility with his dangerous music, put us both to death by tortures fearful to imagine.

Threats, bribes and expostulations were alike in vain. The conveyance and camp equipments being his own exclusive property, I was

compelled to yield to his foolish whim, and, mentally cursing my stupid inadvertence in alluding to the affair of the skeleton, I reluctantly mounted the seat beside my thoroughly frightened companion and started on my return to the post.

Among my most treasured relics is the violin, which my guide in his timid superstition refused to approach or touch, and which I carried away concealed in my blankets. But never in my happiest efforts does its responsive strings give forth such melting harmony as that evoked by the skeleton at my solitary camp in the Bad Lands.

THE FARMER'S BOY.

By A. F. Rice.

The poetry of farming exists chiefly in the mind of him who looks on, rather than in the toil itself. There is poetry in the summer scene where the clean-shaven meadow is thickly studded with green cones of hay and the ox-wagon creaks under the weight of its fragrant load; but it is prose of the baldest sort to the perspiring farmer who is straining every muscle to get in his crop before the shower comes up over the hill. It is the dollars in the hay, and not its fragrance, that he is thinking about; nor is it any discredit to his common sense that he should be more occupied with the money value involved than with the picturesqueness of the situation. We must not expect a poem on the golden rod from the man who spends hours of hard work in attempting to exterminate it; nor can we look for from him any expression of admiration for the daisy when its presence in his grass means pecuniary loss. To him the shrill cry of the hen hawk conveys but one message, and that is that his chickens are in danger. The half-articulated guttural of the young crow is merely a reminder of the corn-pulling and thieving propensities of that bird. The staccato whistle of the woodchuck has no charms for him, for it is a promise that his young apple trees shall be gnawed and a threat that his clover shall be trodden down to make paths for this lumbering freebooter to travel home in. He loves the cuckoo only in times of drouth, and sees beauty in the rainbow only when his parched fields have quenched their thirst. His love for the robins even can never be unqualified, for do they not peck at his cherries and steal his early peas? The waving of the ripening grain and the rustle of the corn would be pleasanter to see and sweeter to hear were it not for his apprehension that the rust would get into his wheat or early frosts cut short his crop.

Of course the farmer's boy suffers, more or less, from these untoward circumstances, and comes in for his share of the tribulation. The very elements seem to conspire against him and make his labors more arduous and exacting. If he has the instincts of a naturalist he will, it is true, see and learn much while at his work; how the blind mole ploughs his underground passage and the toad lives for years shut up in his hard-pan cell; how the oriole builds her nest and rears her young; how the hawk, the adder and the weasel take their prey; how the wasps fashion their papyrus houses; how the ants toil and wage war, and how the butterflies are ushered into the world. But he is kept too hard at work to find much opportunity for indulging his tastes or carrying his observations where his fancy would lead him. The summer woods stand cool and inviting by the side of the field where he is hoeing corn, but the rail fence between them and him is a Chinese wall which he may not pass. The partridge drums in the thicket and the yellow-hammer sounds his reveille on the dry limb, but he may not shoulder arms and obey the call; he has been condemned to penal servitude, and his time is not out yet. Within his hearing the meadow brook goes on its gurgling way, and no one knows better than he where the trout are cooling their speckled sides; but he is chained to the plough, and, like Tantalus, cannot taste the pleasures that go singing by him. I remember of seeing a fair example of this, one bright June day. In

crossing over the hills from one trout stream to another I came upon a small and forlorn-looking boy hoeing potatoes in an immense field, where the stones lay thick, and loose earth for "hilling up" was scarce. The utter hopelessness of his ever completing his task, and the impression of loneliness that it gave me to see that little fellow working away by himself, I shall not soon forget. He told me he was "bound out" to a farmer until he should be twenty years old, and then he was to have "his time and a new suit of clothes." What a patrimony to start life with! I asked him if he was not lonesome out there, with no one to talk to. "Yes, some," he said, "but I've got Gyp with me." And, in response to his whistle, a lean little dog ran out to him from the edge of the woods. Even the dog could not stand that potato field, and had taken refuge elsewhere. He was proud of his canine comrade, and put him through a course of tricks for my benefit. I felt better to think he had even this much comfort and society, and thought of that appropriate line, "His faithful dog shall bear him company." If attempting to hoe ten-acre lots single-handed did not kill him, he has had given him, long ere now, his time and a new suit of clothes. Judging from what I saw, he must have sorely needed both.

There are certain items of farm work which, on account of being light and easy employment and well suited to their years, are usually imposed upon the boys; such as turning the grindstone and mowing away hay. The propriety of this distribution of the work will be recognized by those holding among their reminiscences certain hours spent at the grindstone on hot July days, while an able-bodied man was bearing down his scythe with all his weight upon it; or those other hours of recreation under the high beams of the barn, when, choking with dust and with the perspiration running into his eyes, the small boy, on an unstable and slippery footing, was expected to drag away the hay and tread it down as fast as the strongest man on the farm could pitch it up to him.

It is perhaps true, then, that the old farm is not in all respects a Eutopia, and that the life of the farmer's boy is not altogether a blissful one; and yet who that has spent the days of his boyhood thus would wish them blotted out or give up the sweet knowledge he then acquired, even though it was perhaps distilled from bitter fruit? The shady lane along which he drove the cows to pasture; the orchard where the birds and bees held their summer carnival; the meadow where the bobolink tinkled and the air was saturated with the fragrance of the clover—these and a hundred other familiar scenes which were a part of the farmer boy's life come back to him in a flood of delightful recollections and make him ready and willing to believe that

"God made the country, man made the town."

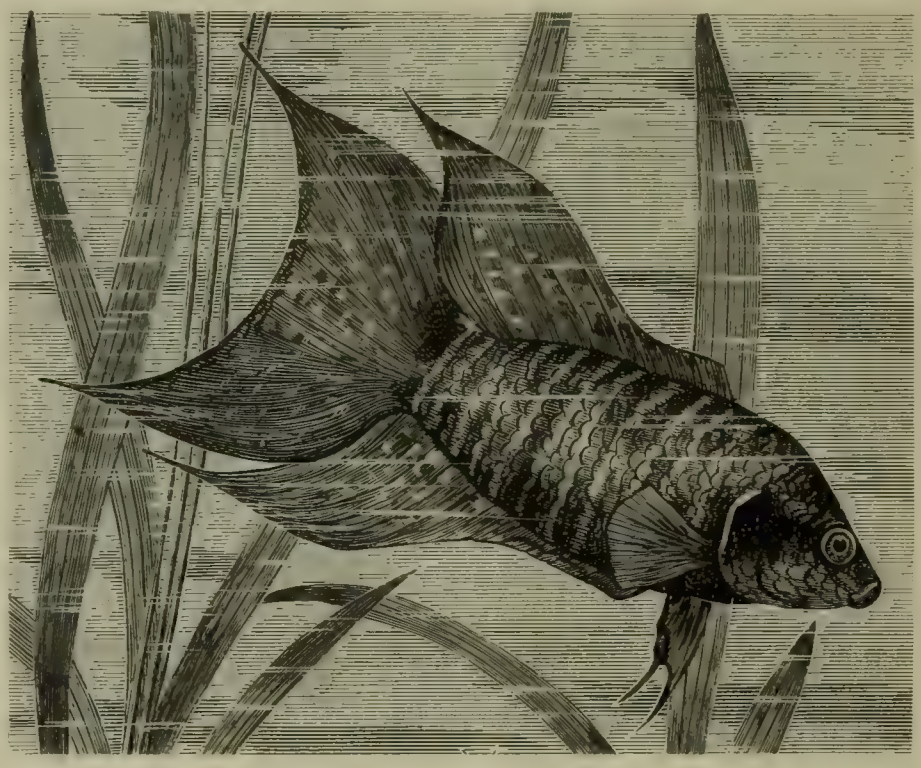
A COVEY OF PARTRIDGES KILLED BY LIGHTNING.

During the month of June a covey of partridges, two adult and fifteen young ones, were found dead on an estate in Southern Prussia. The whole covey lay within a space of a square metre, with the heads together. As eight days elapsed before the proprietor of the estate received news of the discovery, the birds were already too far gone to discover the reason for their death by examination of their bodies. Poison was suspected at first—the spot was close to some peasants' allotments—and the place was carefully examined. In due course it was discovered that the whole covey must have been struck by lightning. One could plainly see where the flash had struck a little mound and from thence proceeded along the ground. The grass surrounding the spot where the partridges lay had a yellow and burnt appearance.

THE PARADISE FISH AND ITS BREEDING HABITS.

By Hugo Mulertt.

The paradise fish, like the German canary, is a product of cultivation, as there is no place known where it is found in a wild state. It is a native of China. There they are cultivated and kept in aquaria as ornamental fish only. The male is the larger of the two sexes, measuring, when full grown, from the mouth to the end of the caudal fin, three and a half inches. The body is shaped very much like that of the pumpkin seed sunfish. Its colors surpass in brilliancy any fish heretofore cultivated for the aquarium. The head is ashy gray, mottled with irregular dark spots. The gills are azurine blue bordered with brilliant crimson. The eyes are yellow and red, with a black pupil. The sides of the body and the crescent-shaped caudal fin are deep crimson; the former having ten or twelve vertical blue stripes, while the latter is bordered with blue. The under surface of the body is continually changing color—sometimes it is white, at others gray or black. The dorsal and anal fins are remarkably large, hence the generic name of the fish—*macro*, large; *podus*, the food or fin. Both fins are shaped alike. They are striped and dotted with brown and bordered with blue. The dull-colored ventral fins are protected by a brilliant scarlet-colored spine, extending three-fourths of an inch behind the fins. The pectorals, situated directly above the ventral fins, are well shaped, but, being transparent, show no color. All these colors above described are most brilliant when the fish is excited. For instance, when engaged in combat for the possession of a female fish, or when courting, he shows the most brilliant colors, in order to attract the attention of his lady-love, she being especially fond of bright colors.



On such occasions he expands all of his fins to their greatest extent. The caudal fin appears then to be covered with little pearls, like the eyes on a peacock's tail, and the under surface of the fish becomes jet black. The color of the dorsal fin changes constantly from brilliant green to indigo blue, now and then showing white spots, and, while the body is in tremulous motion, radiating colors of every conceivable hue. The female is smaller and not quite so brilliantly colored.

The entire body of the paradise fish, from the mouth to the beginning of the caudal fin, is covered with small round scales.

Their mode of living, when compared to American fishes, resembles that of the little dogfish, and the rainbow-darter. Like the former, they come to the surface of the water for atmospheric air, and, owing to this faculty, will live and thrive in a remarkably small quantity

of water. They are also fully as inquisitive as the dogfish, and like to stay near the glass side of the aquarium and observe what is going on outside of the water. Like the rainbow darter, they are fond of resting on rocks or on the branches of water plants. In fact, I have frequently seen them lie down as a person would on a lounge, their head upright and their body resting sideways on the bottom. They are graceful swimmers and peaceable, agreeing well with other fishes. Their food is the same as that used for goldfish, but it should be given to them oftener. Being tropical fish, they are rather sensitive to cold, and the water in which they are kept should never be below 55° F., while 70° to 90° is their favorite temperature. I am the first who imported this interesting fish to this country, and, having succeeded in breeding them, am enabled to add to the above description of the fish their mode of reproduction,

The paradise fish is a nest builder to a certain extent. Its nest is not as complicated as that of the stickleback, nevertheless it is a receptacle on which it places the eggs to be hatched. As soon as the warm weather approaches the males commence fighting with each other for the possession of the females. The victor leads off his female to a suitable corner in the aquarium, and here their family life begins. The nest is constructed by the male. In building it he takes a position about an inch below the surface of the water, and frequently takes air into his mouth, which he ejects in the shape of little bubbles. These bubbles seem to be covered with some viscid substance, which makes them last for several hours. He keeps this up until a little floating island is formed of about six inches in circumference and one-fourth of an inch in thickness. When the nest has reached the sufficient size the female approaches and swims around him several times until he notices her. He follows her now around in a circle, immediately under the bubble island, and all at once, with a very graceful motion, he seizes her by folding his entire body and fins around her, at the same time turning himself with her over in the middle of the water, so that the ventral parts point toward the nest. Now he presses against her and causes the eggs to flow, which, in passing him, become fertilized and rise to the surface. This act being over, the male's attention is occupied by gathering the eggs with his mouth and placing them on top of the bubble island. Should one accidently fall to the bottom, he carries it up again immediately. When all the eggs are cared for the female makes her appearance again, and repeats the operation until about a hundred eggs are laid. The eggs are of the size of a period used in ordinary type, and of creamy-yellow color. Thirty-six hours after the eggs are laid the young fish make their appearance. They are very small and have the shape of tadpoles. The father takes especial care of them, keeps them together and wards off enemies. One even attempted to attack my hand when on the side of the aquarium, looking upon it as an enemy coming to devour his little ones. During the first three days his object seems to be to keep his young near the surface, where they have abundance of air and where he can see them all ; after that he scatters them by blowing among them. He is now seen very busy everywhere in the tank, and often gathers some weak ones with his mouth and spits them to the surface. This may be to instruct them how to breathe.

As the young increase in size his duty is to teach them how to find their food. For that purpose he takes a mouthful of young ones from a thickly-settled place and carries them to an unfrequented spot where food is more likely to be found. In short, he has a system about raising a crop of children. During all this time the female is kept in a far-off corner. He does not allow her to go near the nest, although I have never seen a female injure any of the young, which were sometimes close around her, some even nibbling at her mouth. When the young are ten or twelve days old they have the shape of the old ones and can support themselves. They are then one-sixteeth of an inch in length. At this period the male builds a new nest and a new crop of young ones is raised ; this is followed by a third and fourth, until the approach of cold weather puts a stop to it. Under favorable circumstances the paradise fish will attain their full growth at the age of one year, but five years seems to be the limit of their life.

THE FLIGHT OF THE MOOSE-BIRD.

By Frederic Howard.

Not more than three feet from the desk at which I write stands the inanimate form of one of the best companions I ever had during a trip in the Maine woods. He is a biped, but a feathered one; a rather plain dun and gray bird of no special attraction of plumage or voice. He belongs to the family of jays, and is the most respectable of that garrulous class of birds, and holds the dignity of the order in his keeping. He is the Canada jay of ornithological nomenclature, but I love the name of "moose bird," given him by the Indians from his habit of alighting on the backs of the moose and picking out the ticks that infest the skins of those animals, a feat which I never saw him perform, but, to judge from other actions, should deem him quite capable of successfully accomplishing.

My first acquaintance with this particular individual was one day in September, when the stage that was transporting me from Kingfield up to the noted wilds of Franklin County had halted at one of the springs that are so frequent along the Eustis highway.

We had left the willing horses to stand while we quenched our thirst, and I, returning in advance of my friends, found the subject of our sketch perched on the "off" hind wheel, balancing himself with some difficulty as he peered in all directions in search for stray crumbs from our lunch. That he had evidently gormandized himself from an opened tin of canned corned beef could be seen by the air of indifference with which he regarded my appearance. As the Frenchman said, "I have dined," and nothing could disturb the equanimity of a full stomach.

The more noisy return of my companions caused him to discreetly remove himself to the cover of a spruce that grew by the roadside, and I supposed that we had parted forever.

Two hours later we were enjoying the hospitality of Mrs. Hines, well known to every Dead River tourist, and, while the horses were being changed after dinner, I strolled out to enjoy a cigar. As I passed the rail fence beyond the house a flirt of wings caused me to look up. There, sitting on a stake, was my friend of the morning, readily identified by a white feather on his left wing covert, and eying the stage as an epicure would a feast. I was now greatly interested in my new friend, and, in a burst of enthusiasm, confided to the stage driver how the bird had followed us. The veteran Horace did not enthuse with sentiment at all. "Sho! them moose birds'll chase a camping party for a week," was the manner of speech in which he dashed water on my hopes for a special friendship existing between us.

When we reached the end of our ride at Smith's and left the stage, Mr. Jay was again seen. He was now obliged to choose between his two loves, the stage or its contents, and the top of a lofty spruce was the elevated forum from which he viewed our actions and decided his choice. As we removed our duffle and swung it over our backs, and struck out on our six-mile walk to the lake, he disappeared in the same direction. Nothing more was seen of him until we reached the camps at Tim, and then he was in company with others. He had picked up a few friends as he came through the woods and put them "on to his snap," a condition of affairs they were ready to accept.

It is impossible to transcribe all of the incidents with which he was associated. It might not interest the reader, but there are some things that stand out in his career too good to let go unrecorded.

We were fishing one afternoon on Tim. The trout did not rise well, and we concluded to try bait. Sneer not, my angling friend. We needed fish up at the camps, and therefore were justified. The box of worms "fur bait" that we had brought into the woods at considerable trouble, a fact which we now congratulated ourselves upon, was opened and placed in the bow of our light boat after we had filled our belt boxes. We dropped the hooks to the cool depths to lure the big fellows, and were so successful that we were obliged to renew

our tin lures. I turned to reach for a fresh supply at the bow, but found my claim was preëmpted. My moose bird had found the contents of the large box was to his liking, and he was gorging himself with the worms we had so carefully brought from the settlement. A couple of kindred spirits were watching him with approval from the alders along the old beaver dam, and doubtless envied him his nerve to secure a supper. Our bait was too scarce an article to allow him to continue his repast, and he was admonished to depart. His familiarity cost him his life, for one bright morning, as he was hopping along the trunk of a prostrate spruce in the camp clearing, a sportsman (?) just in from Boston shot him with a Winchester, and, to prove his deed of valor, suspended his body from the doorway of his cabin, from which place he was surreptitiously removed by loving hands, which, though not having the power of life to give, yet preserved his outline of form as a remembrance, sacred to one only, yet appreciated by those to whom Nature speaks in her varied language.

I have had other but more brief experiences with this interesting bird of the north woods. He is a nomad. He claims no particular locality, save the great evergreen forests, as his home. The impulse of migration is evidently an unknown experience to him. You camp down for the night and he quietly greets you, spending the night near by, that he may lose no time in gleaning over the remains of your breakfast. He is immediately interested in your preparations for departure, and, if he can spare the time from his search for a breakfast, will come down to the canoe to see you off, as well as to get an idea of the way you are heading, and, when you are greeted at your next camping place in a similar manner, you are at a loss as to whether it is the social individual of the previous night or a counterpart.

The woods of Maine, dear to me by pleasant associations, would lose half their charm to me without this bird. He is in keeping with the sombre shadow of the spruce and hemlock. Persistent in his presence as the giant tree that rears its lofty form above your "shake down," yet as unobstrusive as its shadow, so closely does he harmonize with the spirit of the silent wilderness.

It is not lost time for the deer hunter to make his acquaintance, as my experience has shown. Once, when at Norris bog, in the Penobscot wilderness, with two companions and a couple of guides from Greenville, we set out for caribou on the bog, each of my companions with a guide, leaving me to my own resources. I sat down on an old log at the edge of the bog and philosophically watched and waited. It was a dreary, damp day. No life was visible, save now and then the rapping of a woodpecker on some dead spruce and a hawk that was flying in circles high up over the marsh. Then a moose bird came to the edge of the forest and started to fly across the bog. About 300 yards distant was a small, thick clump of hackmatack, and, when over it, Mr. Jay plumped into its very midst. He was greatly excited about something, dodging and peering about on all sides, or flying in circles with that peculiar quavering flight. Thinking that an owl might be hid in the cover, I cautiously advanced to secure the specimen, but judge of my surprise when, within fifty yards, a good-sized buck broke cover and started across the bog. Good luck was in my hasty shot, for his antlers now look down from the top of the rack in our front hall. The jay seemed about as exultant as myself, and did not leave the clump of hackmatack until the deer was packed on the backs of our guides and we started for camp. It might be justice to myself to state here that the spilling of the trout chowder that evening was not an entire accident on my part, for I could not with a certainty identify the moose bird that was hovering about the camp, but chose to give him the benefit of the doubt, and enjoyed seeing him feast on the result of my avowed carelessness.

THE EAGLES OF LOCH AU ELEAN.

By James Cameron.

In the southern part of Invernesshire, Scotland, and within a few miles of the base of the Grampian range of mountains, there is a beautiful little loch know in Gache by the name of Loch-au-Elean, the English equivalent of which is the "lake with the island." It is hemmed in on either side by hills covered from base to summit with the silver birch and spruce and fir. It looks at a distance like a mirror richly framed and the old ruined castle which rises abruptly from the centre of the loch adds to the picturesqueness of the scene. Local historians have traced the castle back to the eleventh century, but beyond this date they have been unable to penetrate. About the sixteenth or seventeenth century it was used by the wolf of Badenoch as a refuge from his enemies. For the last ninety years its only tenants have been a couple of eagles for two or three months in the year, numerous owls, rabbits and rats.

The eagles have hatched and reared their young on a turret of the castle without a single break for ninety years. The nest to-day weighs over three tons and is composed almost wholly of small sticks picked up in the neighboring forests. Every year additions are made to it, until now it stands out the most prominent feature of the ruins.

One of the grandest sights that one can witness is this noble bird rising off its nest in the early spring morning and soaring away in supreme dominion over the Grampian range with their snow-clad summits. Many futile attempts have been made to scare the eagles away from their favorite haunt and seize their young, but the proprietor of the ground has adopted every means available to protect them.

I had ample opportunity of studying the habits of these birds, having resided within a mile of the loch for over a decade. There is one incident in connection with the castle which impressed itself on my memory. Three years ago I went home on a visit to my friends and was seized with an insatiable desire to get a look at the eaglets and the huge nest. There was the further inducement to pay the castle a visit that a score or two of rabbits had gone into it when the loch was covered with ice. There is no boat and the only accessible way was either to construct a raft or swim. I chose the latter mode, and in a very short time I was standing in the rude entrance to the castle. I scrambled to the nest, but found that it was impossible to climb the pile of rubbish that had been accumulating for close on to a century, and I had to retrace my steps disappointed. All this time the female eagle kept hovering around, rising at times in spiral movements to great altitudes. The interior as well as the exterior of the ruins is covered with a tremendous network of ivy, and in one end willows and birch trees have taken root in the crevices. The ivy has been utilized as a place of shelter by numerous owls, and here many of them build their nests. I made a search and had not proceeded far when a barn owl fluttered noislessly out of a dark recess and made for a clump of trees nearly opposite the castle. Although the fluttering of its wings could hardly be heard, it did not get more than thirty yards from the castle when one of the eagles swooped down on it with tremendous force, killing it instantly. I swam toward the dead owl floating on the water and on examining it found its wing broken and head reduced almost to pulp.

There are several places in Scotland where the golden eagle and the osprey are found. Two years ago a golden eagle alighted in one of the lonely glens of Invernesshire. It was a rainy day and it could not rise again. A shepherd threw his plaid over it and the bird was taken to Glasgow and lived a considerable time in a cage outside the museum.

OUR NATIONAL FLOWER.

By Dr. Morris Gibbs.

Ye field flowers! The gardens eclipse you, 'tis true,
Yet, wildings of Nature, I dote upon you,
For ye waft me to summers of old,
When the earth teemed around me with fairy delight,
And when daisies and buttercups gladdened my sight,
Like treasures of silver and gold. —*Campbell.*

Are we to have a national flower? and, if so, who is to select it for us? There has been much talk regarding a national flower, during the last few years, through the medium of the papers, and many suggestions have been advanced by the friends of various favorites, but, fortunately, at the present time no selection has as yet been made. By some peculiar power supposed to be possessed by a self-selected few, who have consulted and agreed, we are almost forced to believe that we are already possessed of a national flower in the beautiful golden rod. Just who these persons are, self-authorized to make our selection, we are unable to say, but, judging by their anxiety to hasten matters ere all have been heard, it is fair to infer that they must be endowed by Nature with discriminating powers of a remarkable degree.

The shamrock, thistle and fleur-de-lis were known to all in the countries where they were selected as emblematic, but here in America there are many much better acquainted with foreign species than with the golden rod, and even many of our American-born citizens of refinement do not know this arbitrarily-selected plant, even though it is of such general dispersion.

Without entering into a detailed account of the suggestions offered as to our national flower, with a list of favorites suggested by various persons, we will venture our opinion why the golden rod should not be selected as an emblem. First, it is not universally known, and can only be cultivated with difficulty in many parts; secondly, there are nearly or quite forty species in the Union, and generalizing is a very poor way indeed in a matter which is to remain of national importance; thirdly, we require something typical, well-defined and strictly characteristic of America.

In a careful review of all that can be found on the subject of our national flower, the suggestion of Mr. Maurice Thompson, of Crawfordsville, Ind., appears the most sensible; he proposes the blossom of the white-wood, or, as it is commonly called in the South, tulip tree or poplar (*Liriodéndron tulipifera*). Mr. Thompson has made an excellent selection, and one which should merit our consideration. The tulip tree is alone in its genus, and is emphatically a tree of America, belonging to the magnolia family. It is well known to nearly all, while white-wood lumber forms a stapl article in the market, where it is much in de mand for many purposes. Often but improperly called sycamore, it is generally called tulip, in allusion to its flowers, which somewhat resemble tulips in form. The flowers appear in late spring, and are of a yellowish color tinged with green and orange, and are very handsome but little known, as they are very seldom plucked, the tree being tall and rarely climbed.

Aside from the fact that the golden rod is not considered suitable as a representative of our country, it is, however, a most pleasing flower, and we may well consider it in the glory of its autumn splendor. Gray's manual embraces thirty-seven species and varieties within our boundaries, in addition to which there are undoubtedly several forms yet to be described, while a few of the species may yet prove to be varieties. Embraced in the composite family the golden rod comes in what is known as the genus *Solidago*, a word from the Latin, meaning *to make whole*. The laughable thought at once occurs, when thinking of this flower as our national selection, that the choice is not entirely inappropriate, when we consider that the United States is the universally selected haven for quacks, and therefore it is a worthy standard for our rampant empiricism, from its name. Although so named (a cure all) the genus is considered practically inert as regards medical properties. The pharmacopœia ascribes various effects to *Soli-*

dago; it says that golden rod is aromatic, moderately stimulant, and diaphoretic when given in warm infusions. The dried flowers and leaves are used as a pleasant and wholesome substitute for common tea.

The Golden Rod.

In Michigan there are to be found twenty-four distinct species of golden rod, of which *canadensis* is the most abundant; after which come *Solidago serotina*, *S. rugosa* and *S. nemoralis*. These species, like the others, have no distinctive common names, but are all called simply golden rod and must be distinguished by the scientific names. To the large majority of ramblers and those who gather these flowers there are no points of difference in the various golden rods, all being simply handsome branches of yellow or golden blossoms. It will be seen on even a most casual examination that there is a vast difference in the various golden rods, both as to formation of clusters of flowers, size and height of plants and actual coloration, while a vast difference will be discovered by the amateur botanist in the appointments of the single flowers, as well as in selection of quarters by the different kinds. One class of golden rods may be found growing in sandy soil, while another only grows around low mucky ground, and some species prefer very moist regions.

It will be an advantage to my readers to here classify the various species, but for the benefit of amateurs it may be well to say that the blossom clusters are divided as follows: First, those having the heads clustered in the axils of the feather-veined leaves; secondly, heads in racemes forming a terminal panicle, and third, heads much crowded in a terminal compound corymo. Most of our species I judge are embraced in the second division, in which occurs the *canadensis*, which has a rough, hairy stem, lanceolate and usually serrate pointed leaves rather downy beneath but rough above, and small heads with short rays. It is not so attractive or showy as many others. *Nemoralis*, another well-known species, is one of our smallest golden rods, growing to a height of one or two feet only. Found in dry, open ground, flowering soon after midsummer. The leaves spatulate-oblong or oblanceolate, One-sided dense *racemes*, numerous and at length recurving, and flowers bright golden yellow. Many species of golden rod are three to five feet high, and I have seen specimens

fully six feet tall; some are very pleasing to the eye, and, though all are coarse in formation from the roots up to the flowers, they nearly all have grace in form, and with their crowning clusters of golden racemes and fringes they present a very agreeable appearance.

The *Solidago speciosa* is a kind found on low ground generally, which has the reputation of being one of the latest to bloom in the genus; I have observed it in all its glory as late as October 10.

The golden rod appears to prefer clearings, and, like most wild weeds, springs up where fires have played havoc with the vegetation, but many species prefer the low ground where the soil is watered by numerous springs. The plant does not seem to be changed in its selection of agreeable sites for unfolding its autumnal glory, by any effects produced in advancing civilization, for it is found flourishing in the same retreats where it was seen to annually blossom over a half century ago. Fifty-eight years ago my grandparents moved into this, Kalamazoo County, then a wilderness in the wilds of Michigan Territory. The season was autumn and the golden rod greeted the tired settlers with its handsome yellow flowers and courteous noddings in the gentle breezes.

In those early days all woolens were spun by hand, but the dye stuffs used for coloring had to be selected from the fields and forests, as there was not a drug store nearer than Detroit, nearly one hundred and fifty miles distant. The customs of the Indians were therefore often borrowed, and among them the practice of dyeing cloth with golden rod was adopted. I am at present the owner of a checked blanket which has often accompanied me on my camping trips, which was dyed with *Solidago* fifty-seven years ago, and it still holds its color well and is in daily use. A beautiful yellow will result from the mixture of a little alum with the blossoms for the dye.

Though I do not advocate this plant as our national flower, I consider it one of our most pleasing flowers, and, with all sportsmen and lovers of nature, can honestly say, long live and wave the golden rod.

THE CARNIOLA GROTTO.

A magnificent grotto has been discovered and opened to the public near the famous Cavern of Stalactites at Adelsberg, in Carniola. It is the largest and most magnificent hitherto known in Europe. A walk through it occupies rather more than two hours. It is snow-white in color, relieved only by portions of grayish hue, whereas at Adelsberg the prevalent shade is yellowish. The grotto opens with a deep ravine and a number of comparatively shallow caves, in which the stalactites take the form of curtains, or widely spread wings, and the drops and stalagmites have the appearance of huge cactus plants, with beautiful white glittering pendants. The next cave shows forms of various animals. Going further, the visitor walks through a succession of lofty domes until the "ball room" is reached, three times as large as the corresponding "dancing room" at Adelsberg. The roof of the "ball room" seems to be adorned with hundreds of flags and streamers, each flag having its staff formed of pendant tubes, around which the standards or banners are wound. The most remarkable cave has a vaulted roof; its farthest wall is formed by a snow-white rock of limestone, which divides the grotto from the mountain river Polk, which rushes behind it, and the two side walls are covered with indentations, mostly formed of single drops. There are enormous trees in the centre of the cave, some rising to a height of forty or fifty feet, each with numerous branches strewn with drops instead of leaves, in wonderful regularity of form.

THE RHINOCEROS HORNBILL.

A curious fact in natural history is the partiality of the rhinoceros hornbill (*Buceros rhinoceros*) for the fruit of the *Strychnos nux vomica*, from whence strychnine is obtained. The *Strychnos* is a forest tree which flourishes in the province of Ganjam, in the Madras Presidency, and has a majestic and imposing appearance, bearing clusters of vivid green and golden-colored fruit. In the pulp of these fruits are imbedded the seeds from which the poison, strychnine, is extracted, and the fruit and seeds are the favorite food of that grotesque huge-billed bird the rhinoceros hornbill. Wherever a *Nux vomica* tree is in fruit numbers of these birds will be seen congregated uttering their harsh screaming notes and fighting for the spoil. It is difficult to account for the fact, but these birds seem to thrive and fatten on a poison a very small portion of which is sufficient to kill man or beast. The Mahomedans, amongst whom the flesh of the hornbill is considered a great delicacy, say that the bird's power of assimilating in its body the virulent poison imparts to its flesh valuable medicinal and nutritive properties, and it is in consequence much sought after. It is no uncommon occurrence to take from the crop of a hornbill sufficient *Nux vomica* seeds to kill half a dozen men, and though Europeans have a prejudice against eating the flesh, arguing that as the bird feeds on poisonous matter it must be poisonous, yet this is a fallacy, for a well-roasted hornbill is no unworthy addition to the sportsman's jungle fare, and is excellent eating.

THE DEATH OF SUMMER.

By Franklin Pierce Carrigan.

Softly moan, thou bewailing winds,
For Summer lies cold and white upon her bier;
The semblance of the loveliest time of year
Still lurks within her saddened smiles,
That penetrate the dimness of the autumn mist,
And linger on the hills for miles,
And gild the surface of the woodland aisles,
That sweet September—sad-eyed maid!—has stooped and kissed.

Hide thy luminous face, O, sun!
Bid the clouds distill their azure seas of tears;
More blessed was the life of her that hears
The rain upon her coffin lid.
Bury her beneath the tall, redolent pines,
Where early roses' roots are hid
Till they burst forth in bloom, by bright June bid;
Then bury her where creep the constant ivy vines.

October, strew not there thy leaves!
For their weight, tho' light, might burden her fair breast;
Quench thy hollow moans, oh! winds, and let her rest—
Our love was such as few do know.
The pines (how can they endure the winter's blast?)
Will shield her from the cold and snow,
The murm'rous winds in pity soft will blow,
She'll sleep as all will sleep when weary life is past.

AMONG THE MOOSE, CARIBOU, BEAR AND BEAVER.

By J. Mowat.

Two young men, Fred and Joe, born and brought up in our northern woods in the prime of life and knowing as much of the nature and habits of the game roaming in them as any of the best of our Indian hunters, not finding berths to suit them in the lumber woods, determined on a fall hunt on a branch of the Restigouche River called the Patapedia. One night last month I got hold of Fred and drew from him the incidents of their hunt. I may premise that Fred has hunted from boyhood by spells and with his repeating Winchester is sure on the bull's eye nine times out of ten at a couple of hundred yards. Joe is not so good a marksman, but has also killed both bear and moose.

About the latter end of September the boys procured a couple of dugouts (a canoe made of a single pine tree), also an old horse, which his owner did not care to winter, for a $20 bill. They loaded up with a couple of barrels of flour, a barrel of steel traps and other necessary etceteras, one riding the horse, the other steering the canoes for a point some sixty miles above the settlements. They got up safely on the 5th of October, and their first move was to lead the old horse who had done them so much service five hundred yards from their intended camp, and as Fred said he "felt sore to do it," shot him. Next in order was to get up a home camp or hut and make it secure against invasion in their absence. The next two days were spent above and below their camp in one of the dugouts setting steel traps for water fur, but water fur signs were not equal to expectation and the ice was commencing to form on the still places and old beaver ponds. On passing the poor old horse on their way home signs were visible that some animal had been paying it attention, and closer examination showed that Mr. Bruin had been around. Joe at once wanted a steel set but Fred said :

"No ; the longer we let him live so much the better will be the skin. We are sure of him if we want him."

That night a few Johnny-cakes were cooked (flour, cold water and soda baked hard) in preparation for a four days' tramp to set up a martin line. In early fall these traps, made of wood on the dead fall principle, are set on the ground ; later when snow commences they are in a hollow stub, or a tree is felled and the trap set on the stump. From sixteen to twenty traps is a fair day's work for a hunter, particularly if he has to clear the line or even to spot or blaze the trees along it. As the boys expected snow every day, and, as they intended to hunt in March and April, they set up their traps on stumps, cutting a proper sized tree down for the purpose. It was necessary for Joe to go to the dead horse in the morning to fill the bait bag and also to get sufficient for a "drag." The latter is a piece of meat or game of some sort which the hunter drags behind him on the line of traps to attract the attention of game crossing the line, and it, of course, induces them to follow until they come to the first trap. Should the fisher (wild or black cat as he is sometimes called) strike a marten line, and he is always on the cruise, he makes short work of the wooden marten traps. Generally every tenth trap is set purposely for him, but he will seldom get caught, and if so constructed that he cannot tear it to pieces he will shy off from it. A steel trap is the only remedy, and even then it must be so set with a heavy spring pole as to lift the fisher clear of the ground ; if not you will get his foot for your pains, and I have known instances of their cutting the end of a birch spring pole four inches in diameter and getting away with the trap. Instances are also known of their being caught with only one foot remaining. In size they vary, but are generally from three to four times the size of the marten, of which they seem to be fond and no doubt catch them. Every marten they come to which may be trapped on a line they tear to shreds and will follow the line from end to end, and if the hunter cannot trap him he has to quit that part of the forest.

Let us follow Joe. When he sighted the old horse he also sighted Master Bruin at his

breakfast, and Joe had to let out more than one whoop before he would leave the carcass.

Carrying one rifle, the blankets rolled up with the Johnnys inside, each one with their axe and kettle, and knife on their belt, the bait bag and drag being brought up by the hindmost, the first spotting or blazing both sides of the trees selected on the route, trap-setting commenced. The objective point was another stream supposed to be sixteen miles distant on a southern course, but as the start was not early thirty-five traps were only got down. With a pair of roasted partridges for supper the day ended. Next morning work was resumed with a result of fifty-six traps, a big day's work. The forest was nearly all hardwood and many old and some new signs of moose were passed. The night of the third day, with fifty more traps set, brought them to the margin of what seemed a long and rather narrow lake. Before they got to sleep sounds of moose feeding were heard by Fred, and as the bait bag and drag required renewing, he told Joe there was a sight for moose steak for breakfast.

By the peep of day Fred was stealing along the margin of the lake with the moose signs showing very plenty, the animals having made it a favorite summer resort, which they hang round until the ice makes so strong they can no longer break it. As the lake seemed to narrow below him Fred quietly crept down about half a mile until he reached its outlet; here he disturbed a bank beaver at his morning meal and could have killed him only for fear of disturbing higher game. This beaver is not at all different in appearance from his fellows. Why he prefers a solitary state (the beaver being a regular family man and a very sociable animal) is one of the unsolved problems. Indians say he is a lazy fellow—"won't work; maybe lost his wife or got sick, hunt medicine." To a certainty the castors of a bank or solitary beaver are worthless. But I am digressing from Fred. Not caring to go around the far end and side of the lake, as he could see no end to it, he resumed his back tracks, and when about half way the passage of something on the opposite side of the lake caught his quick ear. Raising his sight to four hundred yards he quietly dropped behind a balsam fir, and immediately a moose emerged from the opposite margin, walked a few steps to the water and threw up his head. After standing a few seconds, and, as Fred expected he would, be turned, probably getting the scent of camp, although a quarter of a mile distant. Fred had him covered from the instant he emerged; also had a good rest on the limb of a tree. But as it was a rather long shot and the animal was head on, deemed it prudent to wait until he could get a sight behind the fore shoulder. The moment the moose turned Fred fired. The shock brought him to his knees and just as he recovered ball number two reached him and he gave three bounds and fell in a heap, turning a somersault. The first ball went through the shoulder, breaking the bone; the second directly through his heart. Fred now collected some driftwood for a raft to cross and before it was ready Joe was on hand with his axe, and in a few minutes they crossed, and then bleeding and skinning commenced, and the carcass was unjointed and withed up to the surrounding trees. As he was a four-year-old male and not a bad set of antlers, the head was also hoisted up, although Joe remarked that "he'd be darned if he would haul it out." With enough to replenish the bait bag and a new drag, with a steak piece, and setting up a couple of traps, the boys put across to camp, and before they had finished their broiled steak there commenced to fall heavy, wet snow.

"Up blanket," says Fred; "it is no use to go on; it will freeze by morning and all the traps behind us, if we go on, will be hard and fast."

The heavy snow also bent the undergrowth in all directions, making it so disagreeable and so wet to travel that no person, unless a hunter, can have any idea of such a tramp.

The next morning was better, the snow frozen hard to the bushes, but the sixteen miles was a hard tramp, as they had to clean and rebait their one hundred and forty traps, out of which they took twenty-seven marten and a rascally fisher who had destroyed five before he got into a steel trap. Don't imagine, dear reader, that the boys carried this game very far without halting and skinning. As for the stretching, it is all done after hours, and generally the first work of a hunter is to get a number of stretch-

ers, commonly cedar, of sizes and shapes suitable. Bear and moose skins are usually stretched between two trees a suitable distance apart, according to the size of the skin.

. The next morning on turning out there were strong signs of Mr. Bruin having been prospecting around the camp the day previous.

"Now," says Fred, "this old chap has a strong notion of house-breaking ; it is not safe to trust him. I'll go up and interview him if possible while you get breakfast, as we must go on the river to-day," and catching up "Killdeer," as he calls his Winchester, and dropping a few cartridges, wound his way up to the old horse

Now, Fred did not want to shoot this bear ; he would rather have left him run or sleep until spring, for the good and valid reason that his skin would probably fetch ten dollars more in price. Fred got along as easy as possible, as Mr. Bruin is sharp in the hearing line, but when within fifty yards he caught sight of the dead horse. Mr. Bruin just having completed his morning meal, and possibly hearing Fred, was leaving quite slowly and was in the act of climbing over a rather high windfall a few yards away. Killdeer in an instant spoke, and, although nearly over the log, Mr. Bruin fell back growling horribly. No wonder. The ball had caught the backbone, breaking it, and deflecting, went through the shoulder, breaking the bone there also. Mr. Bruin was still alive but could not keep his feet, and Killdeer had to speak to him twice before he ceased struggling. Fred having been nearly caught once by a wounded bear which he declares was shamming dead, registered a vow that he would make "siccar" (Scottish for sure) ever after. He had set a bear trap (wooden) in a small, steep ravine one hundred and fifty yards from the main river and passing in his dug-out he landed, touching the canoe on the steep shore, and walked up to examine the trap. On nearing the trap he espied a good, large-sized bear making frantic efforts to release himself of the heavy weight across his loins. Fred at this time carried a heavy Colt's, with which he could do good shooting, so, coming up close and having a fair chance, he placed two balls into Mr. Bruin, aiming for the heart. The bear at once seemed to give up the ghost and Fred at once proceeded to throw the weights off in order to drag the bear to the canoe. It took him only a minute or so to do this, and he turned to twist a withe to haul by, but hearing a growl he wheeled about and within five yards of him was Mr. Bear on his feet, blood and froth issuing from his mouth. Remembering his revolver was empty, Fred dashed down the ravine at the best speed he could put in and lucky it was for him the track was good, being an old lumber road. It was run, Fred, now ; Bruin's after you ! Fred got there first—none too soon, though, for his canoe as he pushed her from the bank and jumped in, was not twenty feet away when Mr. Bear jumped a ter him, but a blow or two of his paddle sent the canoe out of reach. Fred quickly filled up the chambers of his Colt and as Mr. Bear neared him again he made a target of his head until Mr. Colt was emptied, and Mr. Bruin was floating with a riddled head. It made Fred careful ever after not to trust to appearances. By the time Joe got up Fred had the pelt nearly off, and, shouldering a ham each, they went to breakfast. The bear was in good condition and fat from, as Joe said, the effect of his ten days' high feeding on trap baits.

Manning a canoe down river they went some eight miles and on the return gathered up four beavers, two otters, seven minks and fourteen musquash. Two beavers were lost, one having cut his foot and left it in the trap ; an otter had fished another out of a trap and torn him to pieces. The water had risen and flooded their traps, which caused them to miss game they otherwise would have caught, and the still ponds were badly frozen. How would your readers like the sport of a day's polling when the ice makes upon the pole you hold so that it is necessary to beat it every little while to take the ice off it, growing so stout your hand is unable to grasp it ?

Next day the other eight miles above camp had to be gone over in the same manner after a cold night. They could not start until the sun got up to soften the ice somewhat. After a hard day they reached camp near midnight with three beaver, four minks and twenty-two muskrats, and having by some manner unac-

countable lost two No. 4 traps which had been set for otter. Fred declared nothing but a human being took them and they had been carried away previous to the first snow, although no signs had been seen. It is a well recognized law amongst hunters, whites or Indians, that all traps or furs in them are to be held inviolable, and often one hunter striking another line will return the furs he may find in them.

The next day was again snowy and sleety, and as another line of marten traps had to be set, Johnny-cakes flavored with Mr. Bruin's lard, toboggan wood, snow-shoe bows and lots of etceteras were worked at. Next day, being fine an early start was made, the plunder being axes, bait, bag, blankets and drag. A northerly course was decided upon, leading through spruce lands and juniper barrens. This was a big day's work, with nearly a foot of snow on the ground, but the caribou tracks were plenty. At night they had sixty traps set, which was also a big day's work, thirty-five of them being planted by Fred. Next day about 10 o'clock they struck the end of a barren with a few straggling junipers growing at about half a mile from them, and here they counted thirteen caribou. A council of war was held, and, as hide was wanted for snow-shoes (the caribou being preferable to any other), also bait and drag, it was ordered that one of the herd should die. As the wind was right and blowing hard the boys crept along in the spruce woods at the edge of the barren, and on peeping out to learn as to their progress on the herd, a mighty fellow, the lord of the harem, who had been lying down previously, had risen.

"Oh, Fred," says Joe, "take that head for the old man; isn't he a daisy!"

"All right," replied Fred, "I'll lower his horns for him."

On they crept until nearly opposite at about one hundred and fifty yards distant. Some of the herd were scraping the snow from the moss, others were lying down.

"Now," says Fred, "the bull goes first and then that sleek young cow. She is the beef for stews."

When the big stag got the Winchester bullet he gave one leap and fell; immediately recovering, he got three more and tumbled in a heap. Fred had him under the sight, but seeing the last fall knew he was done for. No move as yet was made by the herd, as they had neither seen nor smelled anything. Fred then aimed for the brain of the young cow and she fell like a clod. The boys went over thirty yards toward them, the herd now running at a tangent for the woods, when the cow rose, going like a flash. "Ah," says Fred, "not so fast," and as he swerved to follow the herd Killdeer spoke, but the cow still kept on. The next ball did the job, going right through the heart, the first one having glanced from the skull, stunning her; the second went through the body six inches behind the heart. Skinning, dismembering and tricing up the quarters to trees and burying the offal, so that game coming around would have to go to the traps set for them, occupied the rest of the day.

Next morning the trap setting was resumed, the caribou broil having put fresh life in the boys, and night brought them up on the borders of quite a large lake with fifty more traps for their day's work. Breakfast was had long before day and Fred was away to round the lake, find its outlet and look for beaver. Joe was to go on rebaiting traps, if necessary, on the home track and cutting any bushes in the way of hauling a toboggan. Joe had not gone far before a lynx who had been following the drag on the preceding day unfortunately got his foot into a steel trap. When cornered in this manner they are somewhat ugly and too close acquaintance is not desirable, owing to the length and sharpness of their claws; but Joe this time happened to have Fred's old Colt at his belt and soon fixed Mr. Lynx, skinning him on the spot and making a bait of the carcass, for if another one happens to come that way he is sure to make a meal of his fellow. The lynx have the poorest faculty of smell of any of the game animals and hunt more by sight. The beaver has the keenest, along with with the moose and caribou, but the otter is the shyest. Not one in twenty will ever cross a snow-shoe track; the slightest noise near his place of resort will at once scare him. One noted peculiarity of the otter is where he once crosses the forest from one water to another,

he goes straight as a line, and will on his next visit follow the same route; also, where he slides down a bank or over a rock into the water, he is sure to do so again in the same place when he returns, although it may be months before he does return. He dearly loves to get at a beaver and will watch a beaver family for days, but he cannot conquer unless he gets the beaver at a disadvantage. The beaver's scent is so much superior that he knows when Mr. Otter is near and Mr. Otter dare not attack if Mr. Beaver is in his house, or gets himself protected from a rear attack. I believe no animal except man has the knowledge or instinct of the beaver. Even to say that an animal can tell how a tree will fall, shows something more than instinct. In dam building why will they select one and leave others standing alongside just as suitable, only doubtful if they would fall across the stream? No doubt the wind may deceive them sometimes, but they do not go wood-cutting on windy days.

Owing to the delay met by Joe he was overtaken by Fred when a couple of miles toward home. About noon they reached the barren, having a fisher and four marten. On sighting the barren a small-sized Bruin was seen busy unearthing the remains of the caribou, and so busily was he employed that he knew nothing until Killdeer spoke, when he cleared across the barren on the run, the Winchester speaking twice again.

"He won't go far," says Fred. "Every ball is either in or through him."

Upon following the trail the blood was seen on both sides of the track, and one hundred yards in the woods Mr. Bruin lay dead. "Hurry up" was now the word, and in fifteen minutes the hide was off and the carcass hoisted whole away up a spruce, the kettle was boiling and Fred was ripping the skins from the fisher and another lynx who got in a trap here. Leaving all but the light skins they again started for the home camp, and by the time they reached it they were pretty well loaded, having no less than twenty-two marten. Another council of war was now held, as the first line of traps must be looked over. Three days for one of them, sure. The water fur traps required to be taken up and the skins from the barren and meat must come home. Finally it was decided that Joe should go on the first line and Fred should finish a toboggan, bush out the track and bring a load from the barren. Although tired out it was agreed that the marten skinning should be performed before day and the rest of it devoted to preparations absolutely necessa y. Johnny-cakes, toboggans, wood-cutting, preparing and bending bows for snow-shoes, cleaning any dirty skins, making an axe handle and lots of jobs kept them busy. I may here describe the food while traveling: Some hunters carry two kettles—one to make their pancakes in carrying a bag of flour and fat of some sort, or pork; the other kettle for the tea. These boys always had sufficient cakes baked hard with fat in them; also a piece of fat, clear salt pork, from which a slice was cut and held to the fire on a wooden skiver or branch. If grouse happened to be killed they were generally kept for breakfast and roasted in the hot ashes from the over-night's fire. Of course in camp, stews, steaks, hearts, beaver tails, along with fried trout, was the *menu*, and not at all a bad one.

The next morning good-bye was said by Joe for three days, Fred giving himself two to the barren and return. His toboggan having two long, flexible shafts attached with thongs coming under his arms, with a strap across his breast, the rifle, blanket and cakes all rolled together and tied on left his arms free to use the axe on any bush necessary to cut in his way. If a trap needed fixing or a martin was to be taken out and hung up no time was lost, and Fred strode his six or seven miles, clearing his track by noon. Loading up with two quarters of the young cow, two bear hams and the three skins, he turned for home. Another lynx and five marten paid his wages for the day. Next day he haired the caribou skins, cutting them into thongs and placing them in steep to weave into the snow-shoes, which would soon be required. The following day, as it was soft and fine, Fred manned the canoe and lifted all the water fur traps on the lower line of the river, getting two beaver, one otter, five minks and a dozen muskrats. Upon getting home he found Joe had just got in after a hard siege,

his traps having been terribly robbed, there having been no less than three fishers on the line, only one of them being caught; ten marten and three lynx were added to the store, which was now beginning to look respectable.

The next morning ice was running in the river and it was not possible to get out the balance of traps set in it. However, snow-shoe wearing, moccasin making and meat pies was in order. The next day was no better and no move could be made, as it looked like snow.

On the following morning they pushed through the ice for four miles, but had to take to the shores finally, one on each side, walk five miles and carry traps back to the canoe, the snow coming down fast. Joe had four traps and two beaver to carry; Fred three traps and one beaver, he having lost another trap. These, together with two more beavers and four minks, they took in whilst poling to the home camp, which was very welcome. The morning following the snow was fully eighteen inches deep and Joe started to bush his line, returning to the home camp at night, Fred doing the same. Again they started, each on his own line, each with his toboggan, to remain a week out and extend the lines if signs were favorable. Caribou were very plenty on Fred's division, but having as much as he wanted he would not kill, as the skin is of little value. The boys now being masters of their work, took times somewhat easier, and Fred, when on reaching the end of his line not seeing marten signs plenty, and keeping his steel traps with him, followed the lake to its outlet and traveled the river ten miles through heavy alder flats and old beaver dams, most of which had no tenants, beaver hunters having cleaned them out the year previous. He therefore retraced his steps, shooting a fisher who undertook to cross the lake in front of him. Fred says this was a six hundred yard shot and that the animal sat on the ice perfectly still. On arriving at the barren of course he loaded on half of the big caribou and head, getting home with two lynx, six marten and his fisher.

Joe got back on time with a load of moose meat. He had also been on a branch of the Kedgewick, following the stream for fifteen miles without finding beaver, and seeing also poor marten signs. Those cursed fishers, Joe said, were playing Old Harry with the marten traps and they were shy of the steel traps. One of them, he said, was going on two stumps; the tracks in the snow told him this. However, he brought two lynx and eight marten to help the store. It was now near the middle of November and snow was fully eighteen inches deep, and all the lakes and still places on the river were frozen. A couple of days were spent in camp, a *cache* was built to place their spare meat in for the spring bear hunt; lots of wood got and things made in shape for a month's stay, or until the river froze over. As they had now more time they concluded to keep together, four days of each week being sufficient to examine the lines of traps.

"Now," says Fred, "what do you say, Joe, to a toboggan load of trout out of my lake?"

"All right, Fred, I'll put a five-bushel sack on my toboggan."

"Well," returned Fred, "you go on and get up a lean-to (a shelter made with the bark of the white birch laid on poles and the snow thrown on the top) and I'll bait the traps up."

When Fred got into Joe's camp Joe had partridge stew for supper, but had no time to try for trout.

"Never mind," says Fred, "we'll keep quality hours to-morrow and have them for a late breakfast."

"How do you know there are any here?" asked Joe.

"Thousands of them," returned Fred, "I dreamt it."

The fact was that on his previous visit, the ice in places being clear, Fred had seen them.

The next morning after trying different places Joe struck a school and such fierce biting was never seen before—short, plump fellows—many of them were in fine condition, others again quite thin, dark colored and not recovered from the spawning process.

Now a smoked trout or salmon is rather a tempting bait for all carnivorous game animals. Joe knew it and took all that came for half an hour and then concluded he had enough. Fred was a mile away and had not seen a fin when Joe made signs to him to come home.

The next morning with the new bait they

struck for the barren in a snow storm, and in crossing it to obtain the balance of caribou meat they came within easy range of what they supposed was the former herd, but for reasons already given would not touch them. Seven marten, three lynx and a traveling mink only was disappointing and showed that the marten had left the ground, which they often do, their return being very uncertain, as they have no stated circles of feeding grounds, rambling apparently without purpose, feeding on the moose, rabbit, squirrel or anything they can kill, and when all other food fails they eat the rowan tree berries which remain on the trees during the winter.

After a day in camp Joe's line was gone over. There was Mr. Fisher with both front feet gone just above the paws! Joe knew he would follow him, so on his last trip he set a steel trap on the snow-shoe track without any spring pole, simply fastening the ring on the chain to a bush and immediately above the trap suspended a good sized bait with a strong fastening just within reach of a good jump. Of course the trap was carefully covered. Mr. Fisher made the leap, but, unfortunately for him, his hind feet sprung the No. 4 Wodehouse trap and he was there all right. This trip added thirteen marten and the fisher to their store. For the next three weeks those lines of traps were gone over and baited, and by the middle of December the snow had reached a depth of two and a-half feet, and there seemed to be nothing in the woods now excepting the caribou herds on the north side of the stream. Their last three weeks' hunt only brought them thirty marten and four lynx, and as there was now sufficient ice on the river to travel, it was determined to move ten or more miles down the river. Loading the toboggans with the furs, provisions for ten days and the caribou head, and fixing up the camp until their return to it in March, a start was made, and for the most part of the way they found firm ice. Upon arrival at the point desired camp was made for a week's stay, their object being, if possible, to kill a half dozen caribou before the season closed and *cache* the meat alongside the river as bear bait for the ensuing April and May, this being the bear country *par excellence*, there being burned hills on either side for long distances on which the blue berries grow.

The first day out the boys could not get near the animals, as the caribou can walk fully as fast as a man can snow-shoe, unless in a crust which will not carry him. Running or chasing was not tried, as Fred said: "There are plenty here; the right day will come." The next day they tried the opposite side of the stream and Fred got in on a large one on the run, but at a long distance, with no result, as no signs of blood were left behind him. This night it snowed and next morning a gale from the northwest was raging. "Now," says Fred, "we'll have them." After crossing a half mile of the burnt woods new tracks were struck and in ten minutes three caribou were in sight—an easy shot, in fact a large buck within twenty yards, although scarcely visible through the whirling snow. Such a day seems to destroy the scent, which is caused no doubt by the atmosphere being clogged with fine particles of snow. The buck stood broadside on. "Take him, Joe, behind the shoulder," says Fred, at the same time aiming fair between the eyes of the next nearest. Both fell, but the buck recovered himself and Joe gave him another ball, but it was unnecessary. The third caribou, instead of fleeing, actually made a few steps toward her mate as if to see why she had fallen, when Fred again brained her, she hardly moved after falling. It was at once decided to rip the skins off while they were warm, leaving the carcasses to be hauled out, and as such another day for their purpose might not soon occur, to kill three more if possible, deeming that sufficient.

As the opposite side of the river seemed to show the best signs, they went out to camp and after lunch went up a small ravine. In about half a mile fresh tracks were struck in its bed. "Those can't be far," says Joe, scanning the sides of the hills, and about seventy yards up Joe's eyes caught a body of one among the trees. At the same instant Fred, who was searching the opposite side, got his sight on three close together—an easy shot. Both fired at once. Fred's animal fell, and, throwing in a new shell, shot another, which also fell but again rose, and, instead of running from them,

actually ran down the hill, coming into the bottom of the ravine not twenty yards from where Fred stood. As the caribou passed another ball went through the body, the animal falling into the little stream. Joe had gone up the hill to see where his game had gone, but found no trace, and there seemed to be so many tracks that all was confusion. Fred's third one had also disappeared. He told Joe to keep quiet—not to follow, but come back. Joe felt put out over his ill luck, but kept on traveling on the side hill. This spot had escaped the fire and had its virgin growth of wood, in which the caribou had taken shelter from the storm. Joe had not gone over five hundred yards when, watching warily about and glancing across the ravine, he espied a caribou nimbling at a dead branch on which hung long filaments of white moss, of which caribou are fond. "Just about one hundred yards," Joe said—"no trees this time," and carefully aimed for the fatal spot. One bound and Joe's caribou was down never to rise again. Skins were taken off and rolled up in small compass and a track made to haul out. The day following the whole six were hauled to the river and a *cache* made for two; the others were hauled four miles further down and *cached*, and as they had now considered that they had sufficient, they made a move for the main Restigouche next day, where the boss settler, Wires, resides. The six caribou hides with the second head was added, making two respectable toboggan loads, and we got off on the twenty-fourth of December. As there would be horses bringing lumber supplies up to this point in a couple of weeks, the heads and heavy skins were left to come by team. The other furs, consisting of 132 marten, 5 fishers, 12 beaver, 3 otter, 15 mink, 36 muskrat and 17 lynx, were packed on the toboggan and brought to market. Having bought fur previously from Fred he offered me the lot, but as furs had gone down in price and were expected to drop still lower, I could not offer the price he set on them. I, however, offered him $325, at the same time telling him that I knew there were other parties who would give him more. He accordingly sold the lot for $360 and the party buying sold himself at the same time. I finally bought the hides, bear skins and heads, and give you measurements of heads as follows:

The largest is from end of nose to end of antler,	53 inches.
Base of skull to end of antler,	37 "
Width of small antlers,	21 "
Width at end of large antlers,	36 "

Number of prongs on each antler, 18.

This is the largest and finest head ever seen here. The next one in size is considerably less, with fourteen prongs, but most symmetrical, and would be considered a No. 1 head. Mr. Fred goes up soon again and says he is bound to kill thirty bear before coming back, and probably his spring hunt will be much more exciting than this has been.

THE AQUARIUM.

CONDUCTED BY HUGO MULERTT.

[The Editor of this Department will cheerfully answer all queries relative to the conduct of Aquaria.]

The goldfish is a member of the carp family and a native of Asia. Its natural habitat is standing water. In China or Japan goldfish are found of all colors except green ; they also vary largely in shape and size—some species grow large enough for the table, while others never grow more than a few inches in size. The goldfish may well be counted as one of the domestic animals. It holds the same place among the finny tribe that pigeons hold among birds—they are prized for their shapes and colors.

The first goldfish brought to Europe, from where this country received its earliest supplies, were of the poorest and commonest breed ; they were of a golden color, hence the name for the entire genus ; and it will thus be understood why people speak of black, white, red or blue goldfish. The old-fashioned goldfish lives now in a wild state in this country, and is in fact counted among the native fishes of North America.

Goldfish are easily kept as pets, and most of those that die are killed through mistaken kindness rather than neglect. One of the main troubles arises from the habit of some people to keep more than they can comfortably. A pair of two and one-half to three-inch goldfish should have one gallon of water to live in. If they are larger, they need more in proportion. In buying fish select such that were cultivated and kept in standing water. The sizes of these should be in proportion with the vessel for which they are intended.

In fitting up the globe or tank for them see that it is cleaned without the use of soap ; cover the bottom one inch deep with coarse, sharp, sea or river sand ; in this plant one or more kinds of water plants ; place several little rocks or pebbles about their roots to hold them in place until established, and then carefully fill the vessel to within two inches of the tap with pure water—whether this is spring, well, cistern or hydrant water, is immaterial. As long as it is fit to drink for yourself it is all right, but it should be clear. Now gently place your fish in the water, together with a few water snails and one or two tadpoles, which will act as scavengers ; then set the entire collection where it will have an abundance of pure air, good light, but no sun. Submerged water plants, when exposed to light, purify the water.

Once a day goldfish should be fed with prepared goldfish food. A piece as large as a cent, crumpled up, is enough for two small fish each time. If you feed more than they eat at once, it will spoil the water. To this, their regular meal, you may add, to good advantage, once a week some scraped raw beef or chopped up earth worms, in quantities to allow a small mouthful for each fish.

The inner side of the glass of the vessel in which you keep your fish must be wiped off at least once a week, after which also the water lost by evaporation is replaced. If these instructions be followed it will not be necessary to change the water of the globe oftener than every two or three months, while a square tank will keep six months and longer, but after six months it is best to clean and rearrange an aquarium.

The best temperature for goldfish is between 60° F. and 90° F. They will stand it as low as 32° F. and as high as 110° F., but they are very sensitive to sudden changes—10° one or the other way may prove fatal. When goldfish gasp for air on the surface of the water it indicates that they are uncomfortable, Find out the cause. It may arise from a close atmosphere before a thunderstorm, impure air in your room, or decomposing objects, such as minerals or sea shells, etc,, contained in the water ; at any rate, when you see your fish in that condition attend to them at once, or they will die a fearful death by suffocation.

These are the main points one has to observe to keep goldfish in a healthy state, and under such treatment goldfish may be kept in a thriving condition for ten years and even longer. The important question, "how often the water ought to be changed on goldfish," is therefore thus answered : "As often as it becomes necessary under the prevailing conditions."

NOTES AND QUERIES.

[Under this Department Heading queries relative to all branches of Natural History will be answered.]

Taming Wild Birds.

When young I raised many wild birds, and, as the time is coming for their mating and busy season for building and rearing their young, it may give some young folks pleasure to explain the method by which I was perfectly successful.

I watched the nest of such as I desired to get until the young birds were old enough to feed and not old enough to fly or get scared. I then loosened the nest carefully, placed it in a tight cage near the bars, with a ledge outside, from which it might be convenient for the parent bird to feed them. The cage should be hung in some convenient place near where the nest had been located, on a tree or bush, out of the reach of cats.

At first the old birds are shy, and manifest their disapprobation by rapid darting around and scolding in loud voices, yet I never found them to desert their offspring, but feeding them regularly. I would then begin to feed them, too, with a little sweet biscuit, berries, seeds and worms, or some green stuff. The old birds attended them for a time, finally leaving them to my care. There is a current idea afloat that, after they find their young prisoners, the old birds poison them. It is not so, as I have tested it thoroughly. After removing the cage to the house, the old birds, having ceased their care, I fed them in the usual way, paying the same attention to cleanliness, and carefully giving them fresh water for frequent bathing.

I once raised a pet yellow bird, a lively little feathered creature, about the size of a canary, and almost precisely similar in color. The plumage of the male was of a bright yellow color; wings, tail and crown black. The plumage of the female was more of a brownish yellow. They build their nests in bushes of lichens cemented and interwoven together, and lined inside with some soft substance. They were very thick around the house, as they generally are where mustard seeds are plenty.

I learned to have confidence in giving them their liberty by accident. One harvest day mother came out to the field and excitedly told me that my pet bird had escaped from the cage, which I had set in the window of an upper room. I came to the house feeling sad, as a child would, and found my bird perched in the topmost branch of a high pear tree, gleefully enjoying its freedom. Procuring a biscuit from the house I called to it, and received its chirping answer as it turned its head and recognized its once master. To my surprise it flew down, perched upon my shoulder, fed upon the biscuit, and allowed me to put it in the cage again. After that I gave it liberty. Nothing delighted it so much as to hop out of the cage on to my finger, fly to my shoulder, and manifest its great delight by stooping, ruffling its feathers, spreading its wings in quivering pleasure, and sticking out its little bill to be kissed, like a pouting child.

I had it in the shop one day, hopping around, when it suddenly fell over as in a fit, but recovered only to relapse into another while on my shoulder, and died in my hands. I buried it lovingly back of the barn, with a post for a headstone. *W. M. Kohl.*

A Frog on an Outing.

In the early part of this summer we had a severe thunder storm, accompanied with a high wind, about sundown. The next morning, on entering the sitting room, I saw an object on the carpet near the window of an unusual appearance, and presumed some one had purchased a green rubber frog and placed it there for mischief. On a closer inspection I found it was a live frog, white belly, quite a dark green body and black spots; black stripes across the legs; body three inches long. He was very lively, and I found him perched on the low window sill when I came back with the watering pot to secure my visitor. I covered the top with the exception of a small space for air, intending, after my return from the city, to leave him out and see if he started in the direction of the nearest water, some distance off; but, before the rest of the family saw him, he had somehow made his escape.

I had often read of it raining frogs, toads, etc., but here I had stronger evidence than I had ever heard of, as this front room was the second story, and a very high one, therefore he

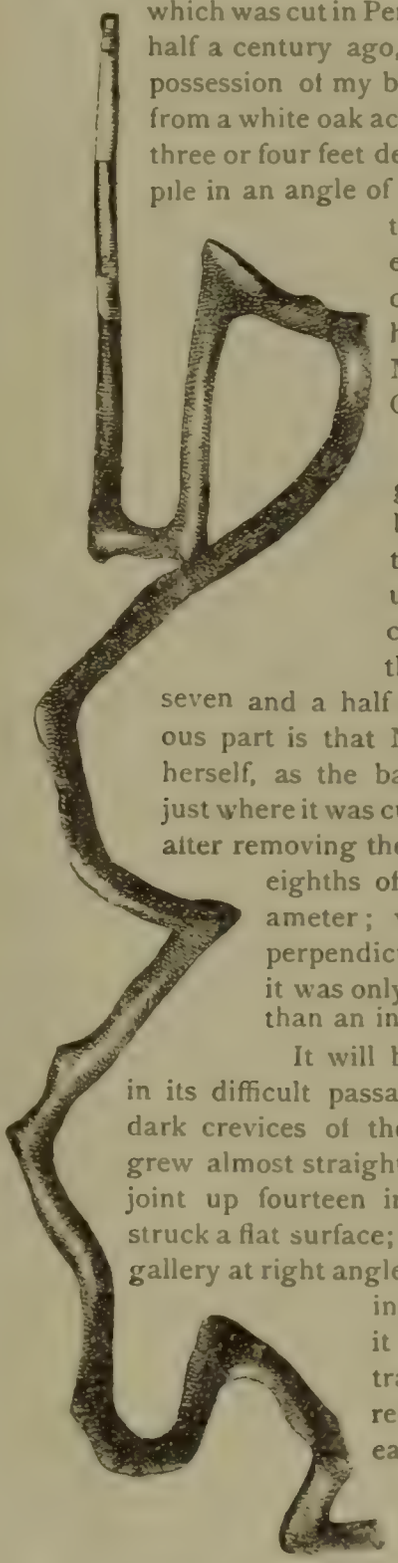
could not have jumped up. He was not born there, except he was borne on the wings of the wind. He could not be accounted for, except the storm picked him up over half a mile off at least, as neither the Little Miami or the Ohio River, with no creeks between them and us, were nearer than that distance, and carried him to the floor of the upper porch, when he hopped or was carried into the room by the storm before the windows were closed, which I learned was done after the fury of the storm had commenced. *K.*

A Mongrel Stork or Heron.

The London Zoölogical Gardens have just received several specimens of the umbrette, which has not been exhibited since the year 1884. It is, however, fairly common throughout the Cape colony and in other parts of Africa, and extends its range to Madagascar. It is one of those birds which has proved a difficulty to the systematist, for it does not fit accurately into any classificatory scheme. It is half a heron and half a stork, with a general appearance which is unlike that of either. On the whole, in its structure it comes nearer to the heron, and it has the rather melancholy demeanor of that bird. It lives upon fish and frogs. Curiously enough, it is looked upon by some of the natives of both Africa and Madagascar as a bird of evil augury. In Africa it is held to be sacred and to possess the power of witchcraft. There is something portentions and solemn about the behavior of all these herons and bitterns which easily accounts for the origin of these legends. Occasionally the umbrette relaxes the severity of its demeanor and executes a fantastic dance with outspread wings. It is also a bird of refined and æsthetic tastes, which are not shared by its immediate kinsmen, the herons and storks. It adorns its nest with buttons, fragments of pottery, bits of glass and any other bright-looking objects which come in its way. The nest itself is enormous—nearly six feet across—and its interior divided into three chambers. This is an unheard-of luxury, especially as it only lays two eggs and does not take in any lodgers, such as cuckoos.

Nature's Perseverance.

The following diagram is that of a cane which was cut in Pennsylvania about half a century ago, and is now in possession of my brother. It grew from a white oak acorn buried about three or four feet deep under a stone pile in an angle of a worm fence on the southeast edge of a woods, on a spur of Edge hill ridge, in Montgomery County.



The cane as given is with the bark off, and, though but the usual length of a cane, three feet, the total length is seven and a half feet. The curious part is that Nature reversed herself, as the base of the trunk just where it was cut above ground, after removing the stone, is three-eighths of an inch in diameter; while three feet, perpendicular height up, it was only a sixteenth less than an inch.

It will be observed that in its difficult passages through the dark crevices of the stone pile, it grew almost straight, with one small joint up fourteen inches, where it struck a flat surface; then followed a gallery at right angles five and a half inches; from here it was obliged to trace its way directly toward the earth, slanting to the left ten inches down where it filled up a space three inches across formed as the opening allowed, and then found its way off to the right, slightly upward, and so on its de-

vious way to daylight. I have not the data for the height above the stone pile.

The photo does not give a correct idea of the twisting, as the point which appears to touch is some distance off, and twists itself in every direction within a radius of a foot and a half.

Undisturbed it would no doubt in time have gathered strength to shove the stone apart, like a curiosity I once saw in Illinois, that of a young tree growing out of the joint between the stones in the third story of a court house, which began to press the stones apart and probably had to be removed.

Another curiosity of a similar nature near here is a gravestone almost entirely imbedded in the trunk of a large tree.

It would be curious to know how long the tree was seeking the sunlight of heaven and free air. *A Student of Nature.*

An Emigration of Ants.

Away back in the '40's, while learning my trade on the *Germantown Telegraph*, I was in the habit of wandering off into the woods or along the shady banks of some stream on Sundays when the weather was pleasant, with a book from Major Freas' (the editor and publisher of the *Telegraph*) library.

One afternoon while lying on a moss-covered bank under cover of the shady wood reading "Rambles of a Naturalist Around Philadelphia," I noticed and became interested in a great army of small black ants traveling along the dry sandy bed of the gutter below me on the roadside. Tracing the line of march back I found they were leaving their old habitation on the side bank among the grass for some unexplained reason. They were not encumbered by any unnecessary luggage, not even provisions. Their young, like maggots without legs, were carried. Thousands of males, females and neuters, the latter being soldiers and workers, comprised the line marching forward. Though scattered, a distinguished feature of order and intelligence appeared, as some were going back and forward, stopping an ant here and there to give some order evidently.

Following the gutter some fifty feet, climbing rough places, threading tangled grass and weeds like thick forests and jungles, they diverged to the left up a steep, grassy bank almost hidden from view, except a glimpse here and there, like an army marching through a forest, they entered their new home in the ground which had been recently made, as apparent from the fresh excavated dirt.

One would suppose that they might have provisions to transport for so large an army until more could be provided, though they may have laid in a supply.

Last summer I watched a colony transporting to their village a supply of mullein blossom, a description of which has been published.

W. M. K.

Do Water Snakes Poison Fish?

Having repeatedly been interested in watching how water snakes feed, I was careful in noting how one particular snake manœuvred to get a meal in Crum Brook, one of the trout streams preserved by the Quaspeake Club, of Rockland County, N. Y., of which I am warden.

The snake darted from under the bank and seized a chub about three inches long, half of its body being in the mouth of the snake. I struck the reptile smartly with my cane, when it darted away, and the fish wriggled off slowly for a few feet and then lost all power of motion, although it did not seem to be even slightly bruised. Upon taking it out of the water I observed a *thick* slime or mucus covering the whole body, which I scraped off, and returned the fish to the water. At first the fish was very active, swimming around lively, but in a few moments seemed once more to lose the power of motion. I again took it out of the water, and found the coating of slime thicker upon its body than before. I scraped it off again, with the same result, but finally the fish turned on its side dead, and in about five minutes, spent in perfect quietude on my part, the snake came from under a submerged stump, seized the fish and disappeared. This incident led me to believe that the snake poisoned the fish by coating it with the thick secretion I found upon its body. However this may be, I now take great care to kill all the snakes that I find in the club waters. *Henry Brendon.*

Nature's Realm.

To those who never study Nature,
  Never see a landscape fair,
Never note the wave of beauty,
  Never feel a balmy air,
These, I say, miss half the pleasure
Of this life, and in a measure
  Lead a life of stupid care.

If we could teach them what a pleasure
  Nature's study brings to us,
Us who love each lake and fountain,
Babbling brook and shaggy mountain,
If we could teach them this, I know
The world to them would better grow.

In NATURE'S REALM, when hope is dead
  And death with hovering wings is near,
Amid some green and lovely vale
  They'd find a fount, whose waters clear
Their fleeting life would stay.

Take my advice, in NATURE'S REALM
  You'll find a cure for every care,
You'll view the landscape bright and clear,
You'll hear the fountain murmuring near,
  And breathe a balmy air.

W. R. W., Jr.

Answers to Correspondents.

L. B. STANDISH.—Your subscription to *Nature*, which was suspended last February, will be completed by copies of NATURE'S REALM to the full amount due you. The thirteen numbers of *Nature* which were published constitute the first volume of NATURE' REALM, which is, however, issued under a new proprietorship and occupies a field of its own, no other publication in America being devoted entirely to natural history popularized in all its branches.

J. W. WILCOX.—We beg to ask consideration from you and our other esteemed correspondents named in this column for the delay in responding to your queries sent to *Nature* some months ago. See above answer to L. B Standish. We now give the information you ask for. The gaur, which extends its range from Hindostan through the Indo-Chinese countries to the Malay Penmsula, is the largest and fiercest of wild cattle, and is said to be not only untamable, but so fierce that it will hold its own against the tiger. It grows to an enormous height, bulls measuring eighteen hands at the withers being apparently not uncommon, and specimens have been recorded, on the authority of well-known sportsmen, which far exceed even this great height. The back is curiously arched, forming a fairly continuous curve from the nose to the base of the tail. The skull is massive, and is surmounted by a large semi-cylindrical crest, rising above the base of the horns. The muzzle is large and full. The horns in the adult bull are, like the skull that bears them, very strong and massive; they extend outward from the head, and the points are turned upward and inward. The color of the animals is a very deep, brownish black, with the exception of a light tuft on the forehead between the horns, and four "white stockings." There is no dewlap in either sex. There is a young gaur at present in the London Zoölogical Gardens.

S. H. DEDMAN.—You are correct; the bull bat feeds upon gnats and other small insects which it catches while flying. In fair weather these ascend into the upper regions of the atmosphere, and the bird flies high to catch them; but, as the weather changes from fair, the insects descend near to the earth, and the bird follows them down in pursuit of food. Picknickers and others may expect rain or falling weather when the bull bat flies low, but can leave umbrellas at home when everything is lovely and the bull bat flies high.

B. W. THOMAS.—The shell of the crab and lobster owes its bluish-gray color to the superposition of two pigments or coloring matters which have been isolated—a red pigment and a blue one. As long as these two pigments exist simultaneously the crustaceans remain gray. But the blue pigment is very fugitive, and sometimes, under the influence of disease, it is destroyed, and crabs are found with portions of their shell more or less reddish. When the crustaceans are immersed in boiling water the blue pigment is entirely destroyed, and the red pigment, which is very stable, appears alone in all its brilliancy.

G. W. GILES.—In the southern part of Russia the peasants put entire faith in the virtues of two small, round stones, found in the head of a native fish, as a preventive to the attacks of colic; hence the term "colic stones," the origin of which you are interested in. The fresh-water drum (*Aplodinotus grunniens*), found in our Western States, has two symmetrical stones in its head, which are often carried as pocket pieces by anglers, but we have never heard that medical or prophylactic qualities are attributed to them. In Russia these bones, handsomely mounted, are often worn as jewelry, especially in necklace orm.

ONTARIO.—About two hundred pounds seems to be the maximum weight of an elephant tusk.

B. L. LONDON.—The "nine-pronged wheel bug," of which you desire to get some information, is described by Prof. Lockwood. He says: "Such is the value of this bug to the farmer that, a very few put near a caterpiller's nest in a fruit tree, would kill every one of them. Its scientific name is *Reduvius novenarius*, the last word alluding to the toothed crest or prominence having nine projections on the body just behind the neck, like a segment of a cogwheel. The insect has a curved proboscis, being, in fact, a tubular beak, which it inserts like a stab into its prey. It then injects a poisonous fluid, so active that its victim soon dies, and then the bug sucks out the juices in a leisurely way. The color of this insect is gray, and the specimen before me measures a little over an inch and a quarter from the head to the tip of the broad abdomen. The *Reduvius* is highly carniverous, attacking any larva in its way. It is among insects what the tiger is among beasts, and it would be a gain to agriculture if we could multiply their numbers. Their eggs are often found on fence rails and the bark of trees. Each tiny egg has the shape of a four-sided flask, attached by the bottom to the bark, and all fitting or standing close together, so making an even surface at the top. Curiously this flat mass of eggs, numbering about seventy, is a perfect hexagon or six-sided figure. The eggs are deposited usually in the early fall, thus hatching out next summer. Of the voracity of the wheel bug it will suffice to say that one insect will devour the juices of five or six caterpillers in a day."

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Do Water Snakes Poison Fish? ..... *Henry Brendon*
Nature's Realm (Verse) ..... *W. R. W., Jr.*
Answers to Correspondents .....

All the above articles are original and written especially for NATURE'S REALM. The Aquarium Department is conducted by Hugo Mulertt, who will answer all queries relative to the construction and conduct of Aquaria. The Note and Query Department is especially opened to record the observations and experiences of amateur naturalists who desire to commune one with the other, and to give permanency and publicity to their field or closet work.

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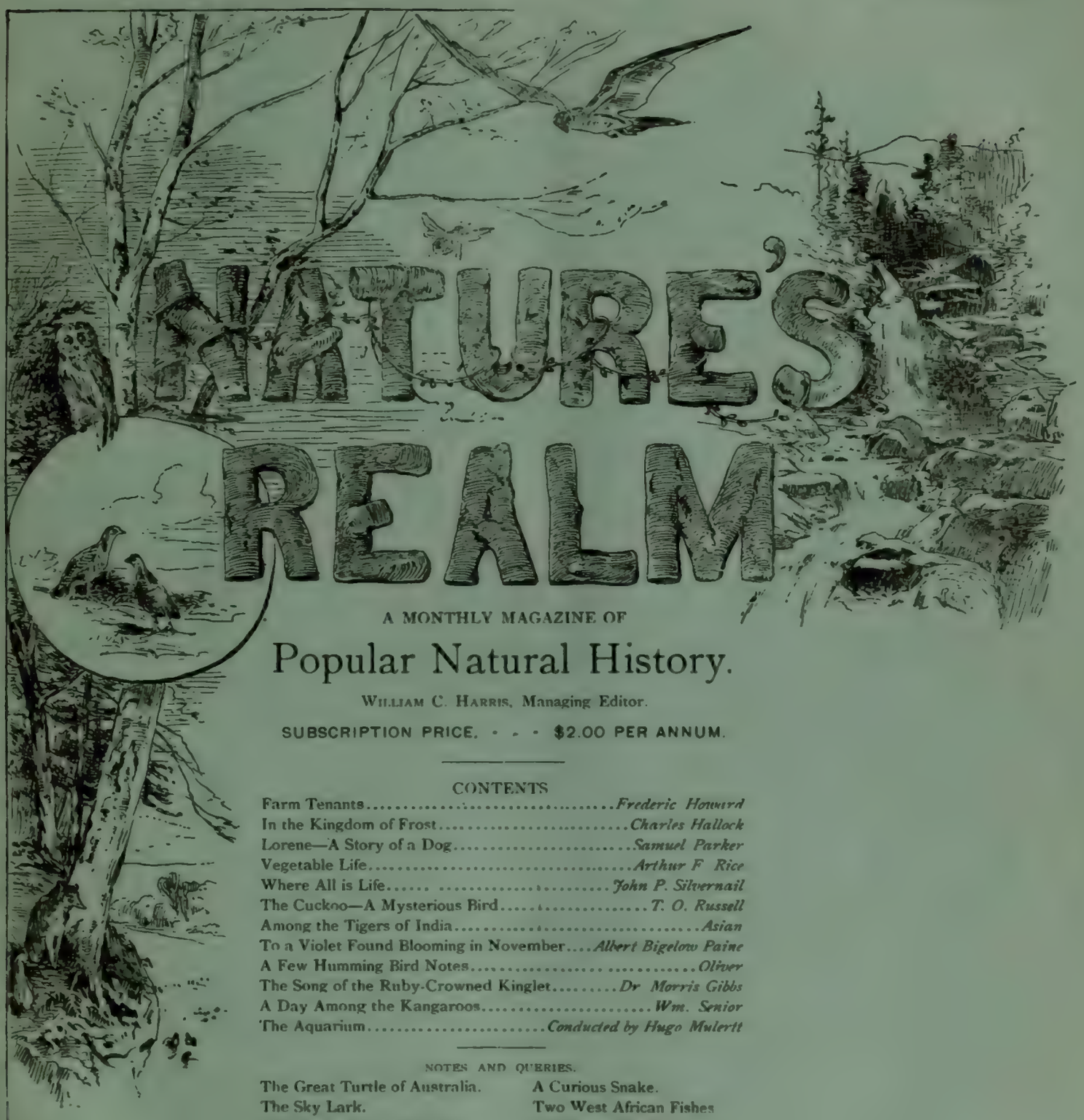

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A MONTHLY MAGAZINE OF

Popular Natural History.

WILLIAM C. HARRIS, Managing Editor.

SUBSCRIPTION PRICE, - - - $2.00 PER ANNUM.

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PUBLISHED BY

THE HARRIS PUBLISHING CO.,

10 WARREN ST., NEW YORK.

J. KLINE EMMET, JR., Pres't H. R HARRIS, Sec'y and Treas

Entered as second-class matter in the New York Post Office

NATURE'S REALM.

VOL. II. FEBRUARY, 1891. NO. 2.

FARM TENANTS.

By Frederic Howard.

That robin's nest was placed in the very lowest crotch of the russet apple tree in the farther corner of the orchard. I had watched the old birds bring the mud, weeds, stalks, and lastly the finer grasses, that, from their use as a lining for the quite bulky structure, showed me that their domicile was completed. I waited in expectation for several days, not daring to approach the nest lest the birds would be scared into desertion. Walking down the outside row of trees one morning, I was delighted to see the head and tail of the mother bird visible over the edges of the nest. She left at my near approach and her mate joined her in noisy demonstrations against my intrusion. My joy was complete when I found that by standing on tiptoe I could just see over the rim of the nest down on the four bluish-green eggs. This to me, a country youngster just out of pinafores, was my first real insight into the home life of one of my many feathered companions. I cannot date my interest in observing the birds that tenanted my father's farm, but from the incident just related springs the first real tangible evidence of either my present ornithological collection or acquired knowledge as to the habits of the central figures of my chosen hobby.

The bluebirds were sometimes seen in mild winters nearly every month, but when from the gable of the barn the phœbe announced his arrival and name in the same breath, we knew that spring had really come. Our phœbe was a very domestic bird, as nearly all the fly-catchers are, and on the joints that supported the floor above the cellar of the hillside barn were evidences of long occupation in old and broken nests of this pert little fly-catcher. They were a fearless pair of birds, going about their nest building and incubating regardless of the presence of the farm laborers, who often worked within a few feet of their nest. I watched them as they patiently taught their young to fly, first to the wheel of the lumber wagon that always stood under the barn, then to the fence that marked the confines of the barnyard, and lastly to the top of the sweep that was balanced at its usual angle over the well at the pasture bars, and creaked with every gust of wind that came around the corner of the barn. When I saw the juvenile *Sayornis* perched in uncertain attitude on that pinnacle I knew their lesson was complete and I had bid them good-bye.

Soon after the phœbe came the white-bellied swallow to dispute in animated twitterings the right of possession to the row of "bird houses" converted from old salt boxes by the mechanical genius of the boy of the farm, and nailed in a row under the eaves of the crib. Harmony was always restored after a few days of contention, and the metallic blue-black of one and the sky blue of the other flashed back and forth all the long spring days of my boyhood.

By the time the bluebirds were bringing forth their young our tenements were all occupied by their tenants of the past years. The cliff swallows were repairing their brittle, bottle-shaped structures of mud under the eaves of the barn, and the barn swallows were dashing in and out through the holes pecked by the flickers during the winter months, and through which the morning sun would send a stream of light into the now great empty mows and

flash back a radiance from the swallows' wings as they flew about just under the rough-hewn rafters.

The great square chimney of the house, which boasted of five fire-places, was ample refuge for some half dozen pairs of chimney swifts. Their ascent and descent were always accompanied by a sound like distant thunder, produced by the whirring of their wings, and so natural as to deceive the city cousin, and ofttimes I have myself started in haste from a midday rest on the cool floor of the spare room during the haying season, expecting to see some darkening thunder clouds looming in the northwest.

In the drooping branches of the row of elms along the highway the gaudy black and yellow of the Baltimore oriole were always to be seen from about the middle of May until the impulse of migration drew them southward, and the purse-shaped nests in various stages of demolition bespoke previous years of occupancy.

The boundaries of the farm need never to have been crossed to find the entire local fauna represented. The swamp thicket, which grew dense after the timber had been cut, was a resort for our smaller warblers, and many a desiderata has been obtained from close search in its depths. In the adjoining woodland was found the roofed nest of that quaint little warbler, the oven bird, and the frail construction of rootlets that serve for that gaudy southerner, the scarlet tanager, and more than once I have flushed the grouse from her eggs, deposited in a simple hollow amongst the dry leaves, without leaving the homestead of my birth.

Down in a swamp grove at the farther boundary of the river meadow a pair of crows always nested, but it is simple justice to state that this particular pair of sable depredators never molested our young corn. It was too near their home for them to excite our wrath, though I must say our next neighbor was not so fortunate. One reminiscence connected with this pair of crows is too strongly impressed on my memory to be readily effaced. On one afternoon in early May I essayed to assault their stronghold. The nest was placed high in a swamp oak and I, then only a lad of twelve, had never attempted such a feat of muscular exertion in the powers of ascension. Progress was slow and tiresome, but at last breathless and triumphant I threw my leg over the limb on which the nest was placed and gazed at the five olive green shaded and blotched eggs, while the discordant cawings of the parent birds rang in my ears like the angry curses of a discomfited foe. How flushed with victory I felt as I glanced down the thirty feet to the ground below. Since that time I have spurred my way with climbers up the smooth trunk to a bald eagle's nest placed seventy-five feet from the cliffs on a dead pine at Frenchman's Bay, and have hung suspended by a rope three hundred feet above the angry breakers at the precipitous crags on Southern Head at Grand Manan, that I might find the homes of the puffin and black guillemot, but never with the same sense of pride in a successful achievement as at this, my first crow's nest. Removing my soft felt hat I carefully placed my treasures into it, and then came the equally difficult problem of a safe descent, but by closely hugging the trunk I slid slowly down, to the great detriment of my trousers, and stood at last safely on *terra firma*, when like a flash the fact came to me that up in that abominable nest I had left the eggs, together with my hat. Here let the curtain fall on the acme of my misery.

On the farther side of the swamp, in the "forty-acre" timber lot, the devastators of our poultry yard had their homes. In this tract of heavy woodland, which was over half a mile long, I found the red-shouldered hawk and the coopers hawk, the hen and chicken hawk of rural nomenclature, nesting in considerable numbers for rapacious birds. This was a secret which, however, I did not betray, for had I informed but one farmer of the locality the old birds would have been shot from their nests on the following Sunday.

A pair of marsh harriers, those inoffensive hunters of frogs and mice, were once found nesting in the huckleberry pasture, for this species differs from its congeners in nesting on the ground, and when I indiscreetly showed my find to a neighbor's son, I was greeted the next afternoon by the sight of the female hawk

nailed to the side of the aforesaid neighbor's henhouse, and my opportunity for a further insight into the breeding habits of that particular pair of harriers was forever blasted.

Seasons have come and gone since I left my boyhood home and entered into the strife in a great city, but the vision of my country life has been to me a delightful remembrance, ready at all times to respond to the beckon of memory's finger and sweeten my daily toil, and with a hope to renew some of the subtle influence of the surroundings of my early life, I left my office one day last spring to revisit the old farm. As I alighted at the little country depot and started on my six-mile tramp my spirits grew buoyant, the fresh morning air and light sun drew melodies of praise from countless songsters, and I pictured in anticipation the old homestead as of yore, but alas! when I drew near I regretted that I had parted with my birthright. A stranger courteously bade me welcome, but my stay was short. The place seemed deserted. The boxes along the eaves of the crib were torn down, the flicker holes in the gables of the barn were covered by clapboards and paint, and the huge chimney was replaced by a modern "box" one. He was considered a "progressive" farmer, yet I do not think the flash of the bluebird's wing at his corn crib, the twitter of the swallow in his barn, or the sociable swift in his chimney, would have retarded his progress. His mowing machine in the field was the juggernaut under which the bobolink and meadow lark were sacrificed, and I thought how, in the bygone days, the little patches of grass left standing by the sturdy, kind-hearted mower, betokened the unmolested homes of those ground breeders.

The delightful old orchard, with its trees abounding in hollow limbs, yet fruitful as the new, was now no more, and where once stood the sturdy "pearmain," with that hollow in the centre of the trunk, from which I had taken one winter four screech owls, was now a sickly sapling of doubtful vitality but of great repute in the catalogue of its mercantile seller. The lofty trees, once the homes of my *Buteos* in the "forty-acre" lot, were lying in the form of boards and shingles at the sawmill hard by, and the brook which had its origin under their shadow, and had supplied our pasture with a never-failing stream, was now but a dry path, a trail of what had gone before, and as I turned away I wondered if aught remained as before, and as if in answer an ebon wing brushed through the stately elms and a crow, with a couple of king birds in full pursuit, flew toward the swamp with an egg impaled on his beak, and I even exulted that at least this crafty bird could hold his own in the struggle for existence against the other biped, genus *homo*.

IN THE KINGDOM OF FROST.

By Charles Hallock.

In this present extraordinary winter season, when the antipodes seem to have exchanged places and climatic characteristics, meteorological surprises are constantly occurring, which, in the higher latitudes, are for the most part agreeable, whatever may be said of the unusual frigid experiences of the southern districts. In Minnesota one of the most beautiful of these phenomena is the exquisite frost work which has on so many calm mornings already filled the landscape with the enchantment of Fairyland. The prevailing characteristics of ordinary winters in that State have been clear, sunny days, with an atmosphere intensely cold and dry. Dampness is unknown and rain unheard of. But this winter it rained continuously on the 31st day of December, and fogs have been of quite frequent occurrence in December and January.

Very much as in the early morning hours of August in Laurentian regions, where dense fogs settle down upon the valleys and lowlands, to be dissipated and burned off later on by the fervent sun, just so in Minnesota this winter a pall of heavy mist has fallen upon the earth with systematic regularity about 4 o'clock of mornings, with just sufficient moisture in its composition to crystallize all objects with a marvelous efflorescence when the temperature subsequently fell somewhat; so that the first imperfect revelation of the opening twilight was what an emotional artist would appropriately call "a symphony in gray"—a dull, leaden sky, with a dead neutral tint, and everything else within sight as pallid and ghost-like as a churchyard full of grave stones. As the day advances and the light of dawn increases, the sky becomes successively dove-colored, lavender and roseate, unfolding more and more with each transition the rapturous beauty of the landscape, until finally the glancing rays of the risen sun light up the whole arcana with a glitter and glory too dazzling to behold, except with averted gaze.

In this supreme moment the sky becomes intensely blue, and every line and touch of frost work on trees and shrubbery and telegraph wires are sharply cut against the cerulean background in tracery of intensest white, defining minutest twig and spray as they never were before. Grapevines and woodbines enfold their trellises and arbors with crystal drapery. The tendrils of the weeping birch and willow depend like the sprays of fountains stilled in mid air. The meshes of lawn tennis nets, still standing as in summer days, vie in filmy texture with the finest Valenciennes lace. The massed lines of telegraph wire stand out in space overhead like the parallel threads of a weaver's loom. Here, there and everywhere the sunlight touches up the foliage and the sprays with prismatic hues which gleam and flash like gems in the pervading light; and later on, when its waxing heat warms the frost work of the trees, it expands like the budding leaves of spring time, until they resemble pear and plum trees in fullest blossom.

And all the while the air is so still and calm, and the sun so bright, and the sky so clear, that one does not realize the great degree of frost until his ears begin to tingle, and peradventure, when he consults the thermometer, he finds the temperature at zero, though his body may be in a glow of warmth.

These frost phenomena are *sui generis*. They are beautiful but harmless; more exquisite than the ice and sleet phenomena of lower latitudes, which break the limbs which they bespangle, or the blankets of fresh-fallen snow which cover the trees in masses of whiteness, which obliterate instead of defining the handiwork of the objects which they envelope. Here the frost work of the fog touches up the trees with the most minute and exquisite tracery, while it clothes them with an efflorescence which is incomparable. There is nothing more delicately beautiful in Nature's realm.

LORENE—A STORY OF A DOG.

By Samuel Parker.

The promise of a present, previously made me by a physician friend, had passed from my recollection, until one April morning an unkempt lad from the village put in an appearance in the yard, carrying on his arm a little basket, which, with a broad grin illuminating his countenance, he deposited on the porch with the remark:

"I've fetched ye thet pup 'at Doc. said he was goin' to give ye."

Cuddled snugly within the basket was a dainty creature about the size of a boxing glove, with chubby paws, white and soft as ermine fur, and enveloped in a soft luxurious coat of glossy white and liver-colored curls. Two gold-amber eyes blinked sleepily between a pair of silky ears which seemed ridiculously large for so petite a body, and a short, clean-cut nose completed the *tout ensemble* of the shaggy bundle which thenceforth responded obediently to the name of Lorene.

Lorene was of the King Charles breed of water spaniels, and her aristocratic descent was conspicuous in her daily walk, and I might almost add conversation, for among her varied accomplishments that rational trait could well nigh have been included. Her amusive pranks threw children into raptures, but, with that intuitive perception peculiar to sensitive natures, Lorene was endowed with the rare faculty of tempering her deportment in strict conformity to existing environments, and in the society of her adult admirers her manners were becomingly sedate and deferential; she accepted their caresses with an air as demure and modest as a convent nun. The eager fondness for sylvan diversions which was developed at an early period in her career discovered a decided penchant for the romantic, for she had an Indian's passion for the woods and she would disport herself in the water as graceful as a mermaid.

Perhaps a mutual tinge of this same spirit of romanticism was the medium which prompted Lorene and her master to those frequent and delightful peregrinations amid the charms of outdoor nature, and made them so familiar with the fern-bordered paths of shady woods vocal with the enchanting whistle of wild birds and the songful harmony of meandering waters. I remark that it was *perhaps* a mutual tinge of romanticism that prompted these gypsy excursions, since in this severely prosaic and practical age, when "red-lined accounts are richer than the songs of Grecian years"; when beneath the austere and withering frown of science beauty stands abashed; when the winsome music of the bells of Fairyland is floating faintly like dream-remembered voices from the realm of myths, an open confession to a predilection of sentiment might be regarded as an unpardonable weakness.

Fortified, however, by the assumption that "all good men love dogs," I am led to chronicle a few of the most salient features in the disposition of this devoted companion of my rambles, trusting, moreover, that every gentle reader may likewise be disposed to the belief that, in common with poetry, music and the ideal arts, the pure well-springs of Nature are the divine sources from whence the fleeting generations fashion their pictures of Heaven, and which inspire their home-wandering souls with that sweetly persuasive and ethereal spirit of adoration that forever tends to keep their faces upward.

Pictures of natural beauty that would have delighted the artistic eye of a Claude Lorraine, and over which the genius of a Byron or Burns would have thrown an unfading glory, revert to memory's eye in recalling the varied and congenial haunts wherein it was Lorene and her master's chief delight to wander. Sweeping expanses of Indian summer woods, haze-dimmed and vivid with the crimson tide from autumn's broken heart; night-enshrouded fields, fragrant with the dewy odor of clover bloom and illuminated with the floating lamps of the fire-flies; winding grass-grown roads, hazel-fringed and blazing with the sumach's fire, leading to marshy springs in pensive forest depths, where the shrill and piercing call of the

cicada, dying away into an exquisitely prolonged and dreamful cadence, alone disturbed the drowsy spirit of solitude reposing on mossy banks; the mystical and dream-engendering glory of summer clouds looming serenely in voluminous and placid mounds of amber above the green ocean of evening woods, with the waning splendor of sunset deepening into purple dusk, and the silvery voice of the hermit-thrush sanctifying the twilight hours till "the place became religion," imbuing my spirit with a lofty veneration for the Supreme Power whose superior intelligence alone conceived these spiritual and soul-appealing tokens; by whose listening ear the cricket's melody is timed, and who walketh the floors of the midnight on an air-woven carpet spangled with worlds.

My statement previously ventured, investing Lorene with romantic propensities, may appear somewhat extravagant, but is by no means an idle fancy. The expression of her countenance was unusually handsome and intelligent, and her soft brown eyes were characterized by that dreamy pensiveness peculiar to impressible natures, while her delicate and exquisitely-proportioned form was cast in what artists would term a classic mould. She abhorred the bustle and confusion of the town, and frequently, when her artful and coaxing blandishments failed to lure her master to the woods or fields for an evening ramble, she would sally forth alone, returning at late twilight with her silken ringlets drenched with dew. During a tempest she loved to sit by a window intently watching the tossing trees outside and listening to the wild music of the pattering rain. On summer nights her favorite place of repose was in her own hammock, swung low beneath the maples, with moonbeams quivering among the boughs, and where whippoorwills and katydids kept up their sweetly weird and unceasing serenade.

Lorene's aristocratic nature was perceptible in many ways. She was a dainty feeder, and, although of a gentle and tender disposition and deeply imbued with a love of Nature, she was not Brahminical, and her *menu* consisted largely of meats; but she was passionately fond of all the various fruits of the season, and, when berries or grapes were not forthcoming, she would occasionally regale herself on the choicest specimens of snow apples selected from among the windfalls in the orchard. With dogs, "mongrel, puppy, whelp and hound, and curs of low degree," Lorene attempted no familiarity beyond a mere friendly recognition—a bowing acquaintance, so to speak; and, with the exception of a handsome Maltese cat, who was both by blood and complexion decidedly blue, her attachments were mainly confined to the human family.

It requires no depth of reflection to perceive that, had Lorene, with her refined and delicate sensibilities, her gentle and sympathetic nature, been possessed of human attributes, she would have been what the world denominates a dreamer. But what of that? Is not the great fabric of human achievement spun and woven from the loom of dreams? Sure am I withal that, had her quiet habits of observation, her quick sense of beauty, been combined with the faculty of reason, she would have mourned over the desolation being wrought by that unrestrained and ruthless spirit of vandalism so characteristic of the present century, and which, with an unfeeling recklessness, is prostrating the majestic forests and robbing the hillsides of their crowning glory, thus disfiguring the face of our fair land and reversing the climatic conditions of Nature, to the great detriment of mankind—the same spirit of vandalism that has strewn the western plains with millions of buffalo, leaving the carcasses to the sport of the wind and wolves, and in consequence of which to-day the appealing plaint of an impoverished nation is heard invoking the advent of a Messiah to lead them Moses-like from their destitution and their misery, and to restore to them the bounteous heritage of ancient power.

Often on beholding Lorene the central figure in a bevy of delighted children, when the usually sober and languid gravity of her manner had relaxed into a spirit of playfulness, have I regretted that she was not in truth a rational creature, for then she could have regaled her juvenile friends with many a winsome story gathered from her woodland rambles—of the hornet's nest among the raspberry vines which she had so inadvertently brushed against, and

of the wild stampede of both dog and master with a score of the pugnacious inmates in hot pursuit; of the cunning chipmunk which eluded her so adroitly, escaping to its lair in the mossy log; of the clever ruse of the partridge with the broken wing which tolled her so deceitfully from the spot where her skulking babes lay concealed among the withered leaves. But she would have refrained from grieving their hearts with an account of the tragedy in the plum thicket—the dove's nest on the branch containing two little skeletons, with the mutilated remains of the mother bird on the sod below. The vandal had been there with his gun.

Lorene's fondness for the society of children was one of the leading traits in her character, and I think the following incident will serve to show that she likewise entertained a favorable opinion of those amiable and time-honored superstitions which tend only to brighten the morning of their existence, and to which the ministry throughout the land, being aware that "even religion delights in shadows and disguises," kindly lends the stamp of its approval.

One autumn day Lorene crouched at her master's heels on the pavement of a little western city, where a large concourse of people were assembled gazing at Barnum's street procession, which presented a spectacle brilliant and imposing. With stately pomp the gilded band chariot, drawn by plumed and bedizened horses, passed along with a flourish of trumpets and drums, followed by the open dens of lions, tigers and leopards. Then came ambling along the solemn elephants with their bespangled housings, and next the haughty and disdainful camels, those antique specimens from the Orient that knew Egypt before the Sphinx's shadow darkened the desert sands, came swinging by with their lurching and ungainly strides, and disappeared from view around the square. But whence the source of the sudden commotion, the clapping of tiny hands, the eager and rapturous applause of delighted children, which now breaks the spell of silent wonder hitherto maintained among the crowded mass of humanity thronging the walks? Santa Claus, with his sleigh and reindeers, his robes of fur, his flowing, snow-white beard and hair and his beaming and benevolent countenance, which for generations has charmed the dreams of youth and innocence in every land. It is little wonder that with the juvenile chorus was mingled the voice of Lorene, for the handsome collar that adorned her neck had been clasped there by childish hands, with the solemn assurance that it came as a gift from this same father saint; and truly it would require a deep philosophy to persuade her master that the lusty barking of Lorene on this occasion was provoked by the extremely bizarre appearance of the hoary benefactor's turnout, or the gamy scent of his reindeers, and not by her righteous and unqualified approval of the general enthusiasm along the line.

In justice to the memory of Lorene, it would ill become her master to indite a fabulous account of her character, or in any way to overestimate her qualities. Be it enough to say that the history is proceeding within the bounds of strict veracity. She was indeed an accomplished creature, and most sincerely have I deplored the dumb limitation which denied her the power of language, for her long familiarity with those scenes of natural and romantic beauty as seen by wood and river, and in view of her superior intelligence, her conversation would have lent an edifying charm to our solitary excursions, and served, perchance, to throw an occasional gleam of light on those subtle and elusive mysteries of Nature which stir the heart to its profoundest depths, but which apparently the eye alone can interpret.

Then, too, had Lorene indeed been endowed with speech and reason, with what a fine indignation, methinks, she would have inveighed against the perverted tenets of that Russian Count across the water, whose intellect exhales a philosophy as rigorous as his own Siberian plains, and who would fain restrict the soaring aspirations of mankind to his own narrow views of human destiny, and to whose unresponsive ears the enthralling spirit of music and the pleading whispers of Nature are alike unmeaning sounds. While themes essentially relating to the wondrous glories of Nature would chiefly have engrossed the mind of Lorene had she been graced with the power of

human understanding, her keenly susceptible organization would likewise have responded æolian-like to the witching and heart-consoling influences of poetry and music, and, in the face of an unnatural and hostile philosophy, she would have dared to cherish and protect the winsome darlings—those radiant and charmful daughters of Heaven who place the world's misgivings and doubts in the cradle of dreams and rock them hopefully and tenderly to sleep.

The peaceful tenor of Lorene's existence, covering a period of five years, was broken only by the cloud of bereavement occasioned by an eight months' separation from her master. Arriving home one balmy May morning from my position on the frontier, whither I had been recalled the previous September, I came suddenly upon Lorene lying on the grass beneath an apple tree at the farthest end of the orchard, where she had long been accustomed to await my return trips from the village. Unmindful of her presence, the ever-confiding robins were tilting about in close proximity, but a pair of suspicious blue jays hovering among the blossomed limbs were pouring forth a torrent of scolding imprecations on the bundle of sleeping innocence below.

My approach had been unobserved by Lorene, and the shock of glad surprise occasioned by my abrupt appearance on the scene apparently transfixed her to the spot, till, in response to the familiar sound of the call whistle, the affectionate creature sprang to her feet, and, struggling precipitately through a convenient aperture in the fence, she advanced crouchingly and tremblingly to my side. There was a human suggestiveness in the expression of her countenance as she approached, and her soft and eloquent eyes seemed to melt in their eager, yet half uncertain intensity; but at the mere mention of her name all doubts vanished, and, apparently impelled by a sudden and uncontrollable ebullition of ecstacy, she bounded away like a meteor in the direction of the house, where, after loud rejoicings through parlor and hall, to the great dismay of mother, she scampered back to the presence of her master, and, darting frantically around him in a circle until completely exhausted, she sank panting at his feet.

One night, a week following my arrival, Lorene reposed by my side on a couch of blankets spread upon the banks of a forest-bound and pickerel-haunted lake, situated near the beautiful Cedar River—so near, indeed, that our ears could catch the sound of its rhythmic volume, the while its loitering waters dallied with the guardian banks or whispered their romantic legends to the constant stars. The quiet loneliness of my surroundings was singularly congenial, but in striking contrast to that of the untamed wilderness which I had so lately quitted. No shrill neighing and thunderous tread of stampeded pony herds disturbed the sober serenity of my reflections; no plumed and painted Indians danced and shouted to the rude music of a tom-tom in the lurid glare of diminutive bonfires; no women mourned on the hills; no wolves howled, but, instead, the witching spirit of silence was broken by no harsher sound than the soft refrain of the whippoorwills, the weird nocturne of the frogs in their bullrush beds, and the dreamful monotone of the incoming waves laving with musical murmurs the long stretches of pebbled shores. Among the myriads of gleaming constellations which sparkled in the vaulted space above was the ruddy face of Mars, a luminary in respect to which the recent perusal of a thoughtful and attractive article from the pen of that engaging writer, Camille Flammarion, had impressed me with an interest curious and profound. Can it be, I mused, that that far distant sphere, that scintillating jewel in the crown of night, is peopled with intelligent beings like ourselves? Do populous cities there rear their lofty spires and domes toward a sky as blue and loving as our own? Do stately vessels ride at anchor in its harbors and bear their merchandise from port to port? Do the winters heap their drifting snows and blooming summers toss their wealth of roses with the same unfailing order as those of earth? Is the sacred calm of its twilight broken by the solemn harmony of cathedral bells, and does the blessed sunlight of day stream through the oriel windows and fall in painted shadows on the sculptured forms of saints and kneeling angels there? Do the midnight winds grieve among the boughs of

weeping willows drooping over graves? Is the poetry of Heaven discoursed to listening multitudes by the silver tongue of a Talmage? But the only answer to these vagrant lucubrations was the peaceful breathing of Lorene at my side and the wild call of the loons from the whispering reeds.

But, in reviewing the pleasant period of recreation experienced by this sylvan lake, there comes a poignant tinge of regret, for it was there that the faithful companion of my wanderings contracted the malady which eventually resulted in her untimely death. Throughout the greater portion of the day previous to our departure in the evening, Lorene, with an unusual and superabundant exuberance of spirits, was constantly in motion, leaping exultingly along the banks or making short and rapid excursions through the outlying woods, anon returning and plunging gladsomely into the cold bosom of the lake. A crampy stiffness of her limbs resulted from this violent exertion, succeeded by internal inflammation, which shortly culminated in death. But during the period of emaciation and misery she displayed a fortitude and patience under affliction worthy of human emulation.

In the evening, a few hours preceding her death, Lorene left her couch and limped feebly to the orchard in search of certain herbs and grasses to which her instinct invariably led her to resort when affected with any of the maladies peculiar to her species, and it was while thus employed that her strength suddenly forsook her, for she was then a mere shadow of her former self, and she sank helpless in the path. When, gently and tenderly, I took the shivering creature in my arms and again placed her on her couch of rugs, I knew that the period of Lorene's anguish would be brief, for the wistful and imploring gaze from the fast dimming eyes that followed my receding form to the door said as plainly as language could have spoken: "Please don't leave me, master; it cannot be long now." That night, with the low melody of falling rain on the roof of the house (as if Mother Nature, moved to compassion for her sufferings, was weeping softly), Lorene passed quietly away—quietly, I am sure, for her couch bore no trace of those contortions which often accompany the agonies of dissolution. One flossy ear alone was upturned above the border of the protecting wrap, and the reposeful expression of her countenance suggested naught but a peaceful sleep. The gust of emotion, however, which I experienced on beholding the inanimate form of my little favorite was dispelled by the candid reflection that Lorene had passed to that bourne which, somewhere amid the interminable realms of space, the God of Nature hath mercifully provided for all of his creatures.

VEGETABLE LIFE.

By Arthur F. Rice.

He is indeed poor who has no part or interest in the riches of Nature; who sees in the graceful elm and sturdy oak only the thousands of feet of boards they will yield; who reckons in the fragrant field of clover no value save the tons of hay it will produce; who catches the scent of the hemlock only with the thought of stripping off its bark for the tan yard. Of such an one it has been written:

> "The primrose on the river's brim
> A yellow primrose was to him,
> And it was nothing more."

It would be better for us if we could sometimes forget the fulness of the harvest to listen to the rustle of the corn; better if we could leave the table, the market and the town behind us to get a breath from the fields and a tonic from the forest.

The path that leads to a knowledge of the vegetable world is so enticing that the wonder is so few follow it. We go about the earth trampling under foot the delicate gifts placed here for our instruction and enjoyment, taking little note of the beauties and wonders of our woods and meadows, or gardens and orchards, our walls and fences. The mosses and lichens—those delicate couches of the fairies—adorn the trees and rocks, but to our dull eyes they are but stains or spots of mold. The bloom creeps up the stalk of the foxglove, but we do not notice it. The flowers and grasses are wet with dew, but we are not interested to know whence or how it came. The pansies and sunflowers each morning face the god of day, and their eyes follow him in his course until he sinks in the west, but this delicate act of homage is lost on us. We recognize in the substance of our bedsteads and bureaus the ash, the walnut or the cherry, but in the forest where they are growing we cannot distinguish them or enumerate their charming characteristics and differences. We attend the flower shows in the city and go into raptures over the orchids and chrysanthemums, but fail to realize that the blossom of the common potato is perhaps as beautiful as anything that grows.

It is said that every man should have a hobby of some sort. If this is true, could our leisure time be more innocently or profitably employed than in replacing our ignorance of these things with an intelligence concerning them?

> "If thou wouldst read a lesson that will keep
> Thy heart from fainting and thy soul from sleep,
> Go to the woods and hills! No tears
> Dim the sweet look that Nature wears."

Robbed of the similes and metaphors drawn from the vegetable kingdom, literature in general, and poetry in particular, would lose much of its grace and significance. The scriptures are full of allusions to the trees and flowers. The Cedars of Lebanon, the Rose of Sharon, the Lilies of the field and the Hyssop on the wall, are but familiar examples of the many instances where these fair creations have helped to crystallize historic facts or aid the imagination in its flights. Scarcely less dear to us are the daisy of Wordsworth and the pine tree of Emerson. Many of the most charming poems of Bryant, Longfellow, Lowell and Whittier have laid the meadows and the groves under heavy tribute for the thoughts and fancies they contain. What a mutilation of their fair pages it would cause to efface what they have written of the trees and shrubs, the ferns and flowers, and even the grasses and the weeds.

A volume might be written on the poetic customs, the traditions and superstitions connected with certain trees and plants. It would tell how it was customary among certain Indian tribes to plant a shrub to keep in remembrance absent children and to show the state of their health; how the Iroquois believed that there were spirits of the corn and squashes who must be propitiated to insure good crops; how the Upas tree of Java was supposed to be deadly in its influences, so that it was fatal to sleep under it, and even the birds that alighted in it were overcome by its poisonous exhalations; how the Lotus of the Nile had so potent an effect upon those who ate of its leaves that they

THE POISON-TREE OR UPAS OF JAVA.

were content to remain there forever, forgetful of home and friends; how the willow was supposed to be typical of sadness and the cypress of mourning; how the juniper was considered the emblem of faith and its fruit a charm to protect the dead from evil; how the holly became consecrated to the festivities of winter, and the myrtle was dedicated to Venus and became the prize for beauty; how the charming tradition of the mistletoe came into existence, and a thousand other equally delightful myths which have perfumed the pages of literature with the scent of leaves and blossoms. Through the entire range of the classics these thoughts run like a thread of gold, and as we read the divine Theocritus and sit with him "under the whispering pine by the side of the murmuring fountain," we can almost delude ourselves into the belief that the forest is still tenanted by the Dryads and wood nymphs, and that somewhere within its shade the Naiad sports, dispensing to the thirsty earth the water she has "garnered from the skies."

To those of a practical turn of mind these things may seem trivial and visionary, but Nature is broad enough for all, and those who prefer an appeal to their perceptions rather than to their imagination may find an ample field for observation. The respiration and circulation of plants, the generation of oxygen and the absorption of carbonic acid, which render each plant an instrument for purifying the air; the relation of the temperature to vegetation and the effects upon the soil, climate and water supply which arise from the destruction of our forests, may prove to be studies of absorbing interest to the most exacting mind.

Nature's methods of dispersing her seeds and perpetuating her species are most ingenious. The breezes of Heaven, the birds of the air, the beasts of the field, the rivers and ocean currents, are all her servants, and they do their work thoroughly. The down of the thistle and the winged seed of the maple sail off through the air far from the parent stem. The burrs and clinging seeds are carried miles in the wool of sheep and goats, and the fur of bears and foxes. The lines of oak, hickory and butternut trees growing along the stone walls and fences are the work of the squirrels. The birds, however, are the most active and universal agents in scattering seeds. It is said that the vegetation which covers the ruins of the Coliseum at Rome—from the grass growing in the crevices of the walls to the fig tree whose huge roots have split the arches—can be directly traced to the birds. The rivers and the oceans are thoroughfares along which the germs of vegetable life travel in their migrations. Pouchet informs us that cocoanuts have floated four hundred miles to Malabar; nuts from equatorial America are often stranded on the shores of Scandinavia, and seeds from Guiana and Brazil have at last found a resting place on the banks of the Congo in Africa; species of mountain plants have been carried by the glaciers, and streams born of them, from the summits of the Alps to the plains of Munich, from the Andes to the islands of Orinoco, and from the Himalayas to the delta of the Ganges.

The vitality of certain seeds is marvelous. Wheat found within the cerements of an Egyptian mummy has been known to sprout and grow, and from soil which has been taken from deep excavations strange weeds have sprung up. In the resources of Nature provision seems to have been made, in case of the destruction of a species, to replace it with another. If a pine forest is cut down an oak forest almost immediately usurps the ground it occupied.

In the relation existing between vegetation and the seasons there seems to be something almost human—something applicable to our own lives, our birth, maturity, death, and even, perhaps, our resurrection. Spring is the season of babyhood. The soil is congested and expands to meet the growing wants of the swelling seeds and tender radicles. The melting snows and gentle rains, which dissolve and make digestible the solids they require, are the milk which sustains their young lives. In the fields and pastures on an early spring morning one may hear a gentle supping sound, as of many tiny mouths drinking. It is the nursing time of the plants and grasses. From the breast of Mother Earth they draw and fill themselves, absorbing the nourishment for their growth and vigor. Summer is the radi-

ant season of youth and beauty and luxuriant strength, of warmth, color, fragrance and bright promise of a rich harvest later on. Autumn is the period of maturity and perfection. The flowers are gone but the fruit has come. The blushing tints and fragrance of the apple blossom have been transformed and re-distilled into the color and flavor of the ripe fruit. The sweet forces of Nature have expended themselves and the consummation is at hand. But the fading leaves of autumn are like the gray hairs of age, forerunners of decay and death. Soon the earth claims her own again, and the soft, white mantle of winter—the winding sheet of the plants and grasses—hides the vegetable world from our sight. Yet, under this canopy of seeming death, the mysterious processes of a new life are going on. Almost before the dead leaves have fallen, the new buds—hermetically sealed against the cold—are forming for another season of leafage and bloom. The yearly miracle is again performed; the shrubs and flowers rise from their long sleep clothed anew and in fresh garments. Who shall say that this transition from apparent death is not the type and solution of that higher problem which concerns our own death and immortality!

He is the richest man who gets the most pleasure out of simple and natural things, whose love for and knowledge of them has enlarged to the uttermost his capacity for enjoyment. He who goes forth into the fields and forests with senses alive to the beauties and marvels about him; whose ear is attuned to the lisp of the leaves and the sweet, sad song of the pines; in whose nostrils the pungent scent of sun-seethed ferns and the divine odor of the arbutus act as delightful restoratives; whose eye is charmed with the silver sheen of the poplar, the spot of flame where the wild honeysuckle blossoms on the ledge, and the lowly dandelion "fringing the dusty road with harmless gold;" such a man surely possesses an antidote for melancholy and a never-failing means of gratifying his highest instincts. Others may starve their souls in too strict an attention to practical pursuits, or grow lean in the search for what the world chooses to call pleasure, but

> "He on honey dew hath fed,
> And drank the milk of Paradise."

WHERE ALL IS LIFE.

By John P. Silvernail.

It has not been my lot to tread
  Along the paths of glorious Time,
Where buried lie the immortal dead
  Who flourished in Earth's natal prime.
Not mine to muse on Helicon,
  Nor walk in rapturous reverie,
Where "the mountains look on Marathon
  And Marathon looks on the sea."
Not mine to catch the Muses' strains
Above the moist Bœotian plains,
Nor listen, with my soul on fire,
To rapt Apollo's rhythmic lyre.

But I have walked where none but God
  Had gazed the enchanted scene along,
Where never human foot had trod
  The dim-aisled, forest shades among.
Where rocky ramparts rose around,
  Aspiring to the height of Heaven.
I've stood 'mid silence so profound,
  It seemed that to my eyes 'twere given
To see Earth in her primal morn,
Ere sound and life and love were born—
Have seemed to lose all sense of space
And meet my Maker face to face.

Within those peaceful solitudes
  No "Thanatopsis" e'er is heard
But Nature's mighty interludes
  And Nature's God's omnific word;
For, as in Eden, long ago,
  He walked at evening's fragrant hour,
So here, 'neath mellow sunset's glow,
  Show fair the footprints of His power,
Where rotting rock yields to the touch
Of rootlets' soil-creating clutch,
While bright the snow-capped summits shine
Above the ascending timber line.

Each breeze, each rain drop, and each ray
  That streams from forth the vernal sun,
Speaks of a resurrection day
  And tells of labor just begun.
In these new Edens of the earth
  No graves are found—all, all is life,
Even as when Time first had its birth,
  Ere brother's hand was raised in strife.
Prithivi-like the earth brings forth
All forms of grace and matchless worth,
While everything breathes prophecy
Of something yet about to be.

Thro' all her frame th' embracing God
  Sends thrills of wondrous ecstacy,
Till, all transformed, the lifeless clod
  Smiles, blooms and brightens gloriously.
Glad flowers spring with fragrant breath,
  And climbing vine and budding tree
Proclaim such triumph over death
  That song birds wake their minstrelsy;
Each leaf responds to zephyr soft,
The torrent lifts its voice aloft,
While everything in Nature saith:
"There is no death! there is no death!"

Never, where ruined empire sleeps,
  And buried greatness, turned to dust,
Still its unbroken silence keeps
  'Neath storied urn or marble bust,
May it be mine to walk and dream,
  Recalling all their vanished pride,
Until once more to live they seem,
  And walk in grandeur at my side;
Nor where the radiant sons of men
Have been resolved to earth again,
Till earth seems but the burial place
Of Adam's sin-cursed, mortal race.

But oh! what joy to breathe the air
  Where God's unfinished gardens shine,
Where myriad forms rise new and fair
  Beneath His touch divine;
To watch a new creation spring
  Where funeral dirge was never sung,
And hear resounding echoes ring
  The mountain crags among,
While glaciers grind their grist of rock
'Mid avalanche roar and earthquake shock,
Till Nature's transformation scene
Shows rocky ranges robed in green.

THE CUCKOO—A MYSTERIOUS BIRD.

By T. O. Russell.

Thrice welcome, darling of the Spring,
Ever yet thou art to me,
No bird, but an invisible thing,
A voice, a mystery. —*Wordsworth.*

With the exception of the lark and the nightingale, no European bird has had so much said and written about it as the cuckoo. While its musical performances are much inferior to those of the two well-known singers mentioned, its song being monotonous and unvaried, it may be classed among the most extraordinary and interesting birds. In many ways it is most peculiar. It may not possess the curious shape of the Australian dodo, but its habits are stranger and more mysterious than those of any other well known bird. In the habits of no animal is the all-powerful mastery of instinct so fully manifested.

The habits and mannerisms of the cuckoo have been more acutely observed than perhaps those of any other bird. For thousands of years naturalists have been trying to understand and explain its mysterious ways, but have not fully succeeded. There yet remain many impenetrable and seemingly never-to-be-understood mysteries connected with it. Enough about it has, however, been found out to prove that it is the bird of the strangest habits known to men. It seems curious that European naturalists have not long ago succeeded in finding out everything connected with the cuckoo. Were it a native of America, it is safe to presume that more would now be known about it, for Audubon alone would have devoted years to the study of its habits, and would have solved every mystery connected with it, if they were capable of solution.

The cuckoo (*Cuculus canórus*, Linnæus) is found almost all over the continent of Europe, but its habits in those countries popularly known as the British Isles shall only be mentioned here. We know that its habits and peculiarities are the same, or nearly the same, all over the rest of Europe.

A native of this continent can hardly realize the charm of the notes of the cuckoo. From a musical point of view there is not much in them, but the name of the bird is evidently onomatopoetic; that is, formed from the sounds emitted by it, and this name is the same, or nearly the same, in the languages of all the countries it frequents. The two notes are uttered with such wonderful softness that they are really harmonious and pleasing, but they derive their principal charm from the time of the year in which they are heard, for the song of the cuckoo is a sure harbinger of summer. It is heard in that most delightful period of the year when the spring is ripening into the glory of summer. The first notes of the cuckoo always cause a sensation of delight. They seem to say: "The glory of the year is at hand. I bring summer with me."

The cuckoo is about the size of the common American wood pigeon, and is much of the same color, only not quite so blue. It never varies a week in the time it makes its appearance every year, which for Great Britain and Ireland may be set down as about the 25th of April. In Southern Europe it appears a month or so earlier. It remains only six or seven weeks, and is rarely heard after the 10th of June. Toward the end of its sojourn its voice becomes hoarse and disagreeable, very different from the rich, mellow tones, it uttered on its arrival. After it has ceased to sing it is rarely seen. Where it comes from or where it goes to seems still a matter of doubt. It evidently passes the winter in some southern climes south of the Mediterranean, probably in Egypt, Algiers and the adjacent countries, but it sings only in Europe. It would seem that there is no positive proof that it spends the winter in the countries mentioned. Birds, however, resembling cuckoos have been seen in them in winter, but whether they are really cuckoos or not is open to a good deal of doubt.

The cuckoo's sole object in visiting Europe is to breed, and here we become acquainted with one of the most extraordinary habits of this mysterious bird, for it makes no nest, but deposits its egg or eggs in the nest of some other bird to be hatched. Why it does this,

why it does not make a nest like any other bird, is the mystery of mysteries about the cuckoo. It may be said that the short time it remains in Europe (only about six or seven weeks) prevents it from building a nest and from hatching its young. But why does it stay so short a time? If it can live in a northern clime for six or seven weeks, why can it not live for six months? These are questions that never have been solved, and probably never will. If it be a bird that can only exist in a warm climate, it is a strange thing that it does not go to northern latitudes in the hot weather, but leaves them just when the heat is beginning.

The Cuckoo.

It is in the nest of the hedge sparrow that the cuckoo generally lays or deposits its eggs, and, so far as has been discovered, it never puts more than one egg in any nest. It puts eggs in the nests of other birds, but the unfortunate and stupid hedge sparrow is the favorite foster mother to which the cuckoo usually gives the rearing of its young. The hedge sparrow is not known in America. It is larger and darker than the now well-known English sparrow, which has become such a pest in our large cities. The hedge sparrow is essentially a country bird; it never builds in houses, and is never seen in towns or cities. This is favorable for the cuckoo, for it is a shy bird, and is never seen in, and seldom near, towns or villages. It has been proven beyond any doubt that the cuckoo sometimes puts its egg in a nest placed in such a position that it could not possibly *lay* the egg in it. Cuckoos have been seen to lay their eggs on the ground and then carry them in their bills and place them in the nest of the bird that was to hatch out the young stranger. It is a well-known fact that shortly after the young cuckoo leaves the shell it has the whole nest to itself. It ejects the young of the bird that owns the nest by taking them on its back, pushing them out and letting them drop on the ground, where they soon perish, and the young interloper then receives the entire attention of the foster parent. Here, perhaps, is the most extraordinary instance of precocious instinct in all Nature. The young cuckoo is generally, in fact always, twice as large as the young of the bird in whose nest it is hatched, and it requires much more food. The foster mother would never be able to attend to its wants and the wants of her own progeny, so they are unceremoniously ejected

in order that the wants of the interloper may be fully attended to.

It is not known exactly what time the young cuckoos leave Europe. They have been seen in the fall of the year full-fledged, and as large as the parent birds when they arrived in May. Not being gregarious and never appearing in large numbers, it is no easy thing to trace their emigration from the country of their birth. Never more than two are seen together or in the same locality. These would hardly be noticed were it not for their well-known song, so different from that of all other birds in the countries where they breed. The young cuckoos never sing during the first year of their lives; it is not until the next spring, when they return to the country in which they were born, that their well-known and welcome notes are heard, the harbingers of summer.

There is hardly an instance known of any other bird emigrating by itself and unaccompanied by its parents, or at least by older birds of the same species. But the young cuckoo has no other bird to steer its course for it over the pathless sea. It goes by itself, guided by that unerring instinct which, the more it is studied, the greater marvel it becomes, and we stand awed before one of Nature's most stupendous and impenetrable mysteries.

The cuckoo is a bird of great power of flight, and a journey from England to Egypt would hardly take it more than three days. This remarkable swiftness of wing makes another difficulty in tracing all the goings and comings of this most curious and remarkable member of the feathered tribe. If cuckoos were gregarious and went in large flocks, much more would be known about them, and, if they were birds seen in moderately large numbers, we would have a much better opportunity of finding out their habits; but, as has been said already, they are what may be termed with strict truth rare birds.

There is another peculiarity or mystery connected with the cuckoo that is worth mentioning: it is never seen in spring or mating time without a small bird or two along with it, and this little attendant is generally of the lark species. When the cuckoo alights on a tree so does the little bird; when the master or mistress flies away so does the servant, and generally at a respectable distance behind—about the distance usually seen between an equestrienne and her groom. Why these little birds follow the cuckoo, and what their offices are, add to the impenetrable mysteries connected with this extraordinary bird—mysteries that probably will never be explained.

It has been thought by some that the reason the cuckoo builds no nest is because it has not time; that Europe and the countries in which it breeds do not afford it proper food, and that the countries that afford it such food are not such as its young could be hatched or raised in. This theory will not stand a moment's examination, for it is very hard to see why any bird could not live for three months in any country in which it could live for six or seven weeks, and three months would give it ample time to build a nest and hatch its young like any other bird. But a still stronger argument against this theory is furnished by the fact that the young birds remain in the country where they are born until late in the autumn, when they go—no one really knows where.

Many species of birds of the genus *Cuculidæ* inhabit this continent, but none of them are surrounded with that mystery that is so characteristic of the European cuckoo, and none of them have so far excited the curiosity of the naturalist or touched the sentiment of the poet.

AMONG THE TIGERS OF INDIA.

Why is it that in shooting—and especially in tiger-shooting—some men may fag and toil day after day without any reward, while others who take infinitely less trouble have greatness thrust upon them, and invariably meet with the luck of the Prince of Darkness himself? writes a correspondent of the *Asian*. I take a personal interest in the solution of this riddle, for though, in shooting trips on the Nilgiris, I have spared no pains, I have not been as lucky with the hill tigers as I deserved to be. I believe myself that my ill-success, and that of others, is in a great measure due, not to a scarcity of tigers, but to their extreme wariness. On the plains in the hot season you can force a tiger to meet you; but upon the cool Blue Mountains there is abundance of water and shade throughout the year, and Stripes is master of the situation. But making due allowance for this the fact remains, and an irritating fact it is, that I have been just too early or too late for several good things, and hence the tears which head this paper.

A few years back I had arranged with a chum to meet him at his *tote* on a particular date, and *hinc illæ lachyrmæ* for a fortnights' trip. A dose of fever detained me, and I arrived at his bungalow two days late. There I found he had already started, and I posted on to our trysting-place at once. H—— was away from camp, and did not turn up till evening. He brought back with him a grand tiger, and my mortification on hearing how he bagged it may be better imagined than described. Our camp lay in the centre of a well-known tiger's beat; in fact, we had selected the site in the hope of an interview. H—— told me that directly he arrived he had set to work to try and glean some news of the tiger, but on the first day had heard nothing. Early that morning he had left camp for a stalk, and had crossed the hills that lay between us and the B—— River, some four miles away. Just at the head of a steep ravine that runs up from the river he had taken up his post on the look-out for ibex and sambur; and had not been watching half an hour when he saw four tigers at the bottom of the ravine in a loving family group. They were coming up an old elephant track, which passed some sixty yards under H——'s post, and when they were immediately beneath him he opened fire, with the result that the leading and largest tiger collapsed at once. H—— had five more shots at the other three before they reached the cover of a large sholah, but could not say whether any of the bullets had taken effect. There was no blood on the track, and the sholah was far too extensive to be explored single-handed, so he had returned with the skin of the tiger he had bagged. "Had you been with me, old chap," said H——, winding up his narrative, "we might have accounted for all four." Whether I blessed or cursed the fate that had made me miss my appointment by a couple of days I will not say.

We determined to start the next morning with every available man, and to beat the sholah thoroughly, though neither of us had much hope of coming across the other tigers. We were up and ready by 4 A. M., and reached the ravine just as "morn broadened on the borders of the dark."

Sending all the men and the few dogs we had down to the bottom of the sholah into which the tiger had retreated, H—— took one side and I the other. Several sambur broke, but they were all hinds and brockets, and I reached the head of the sholah without having fired a shot. Here H—— joined me, and we had just begun to discuss a cigarette apiece, when the dogs gave tongue. Two minutes afterwards Bill, the shikari, burst out of the sholah with the news that another tiger was lying dead not twenty yards from the edge. We made our way through the jungle, and, stone dead in a stream, we found a nearly full-grown tiger. A shell from H——'s express had entered his stomach and had done fearful execution, but still the tiger had managed to travel full 600 yards, and even then, as we could see from the ground, had not given up the ghost without a struggle. I slapped H—— on the back; but I am bound to confess that a feeling of disappointment of having missed this

golden opportunity mingled with my congratulations; and this H——'s sympathy, though perfectly genuine, did not tend to dispel. A chance of a tiger lost, and all through an inopportune dose of fever. But such is sport!

We shot on together for ten days with fair success, when H—— was summoned to his estate. I still cherished a fond hope of coming across the tiger on whose domain we had intruded, and decided to remain a few days longer, so H—— went back alone.

Not far from camp, at —mund, was a cattle kraal, which was occupied at the time by a mixed herd of cows and buffaloes, under the charge of some Badagas, who had come out to this remote spot in search of pasture. Two days after H—— left me, a Badaga came to my camp with the news that on the previous night he had been awakened by the sound of a scrimmage going on in the kraal. Rousing his companions, they made as great a din as they could, and after a short time the scuffling ceased. Morning showed them that a tiger had cleared the wall of the cattle pen, and had killed no less than five cows. This made me set the marauder down as a tigress, for the spirit of mischief is ingrained in the sex. The Badaga had posted off to me with the news, and I at once went back with him to the kraal. I thought it probable the tiger might return, and determined to sit up for him. But where? was the question that puzzled me. The kraal, simply a circular stone wall about four feet high, was built on the open hill-side; not a tree or bush was there to afford me shelter. I was fairly nonplussed, but at last a bright idea struck the Badaga. Why not sit up in his little hut? Though I did not quite relish this, there was no alternative, and I resolved to adopt this course. The hut formed part of the circumference of the wall, and was roughly built of stone. The walls were of rubble, and several long slabs of stone laid across these formed a roof, the entrance facing inward toward the kraal. It was necessary that the Badaga should be with me, for this race has a very strong and quite distinctive smell, and the absence of the aroma might have made the tiger suspicious. This may sound absurd, but I believe that had I sat up with Bill, a Tamil, the tiger would not have put in an appearance, owing to the difference in the effluvium. But to induce the herdsman to watch with me was no easy matter. He had been thoroughly scared the previous night, and refused point blank at first, begging me to let him stop with my men in camp. The promise of *enam* (money), however, brought back his courage, and I agreed to meet him at 6 P. M., after the cattle had been driven home. He promised at the same time not to disturb the carcasses. I was there true to time, and we began our vigil directly twilight fell. We chatted in whispers for some time, and at length I bethought me of a flask I had put in my pocket before starting from camp. I took a mouthful, and poured out a stiff dose for the Badaga. This dispelled his fears, for he thumped his chest, and gallantly declared himself ready to meet the tiger face to face. Very soon, however, the spirit had a soporific effect, and the Badaga sank back buried in blissful sleep. Night spread her sable mantle over us, and the animals crowded in front became gradually more blurred, until shortly I could distinguish nothing but a shadowy black mass. The only sounds that broke the deep silence were the inexplicable voices of the night, mingled with the crunch, crunch, of the cows all round us, and the stertorous breathing of the Badaga. Time sped on, and the moon rose in all her queenly majesty, bathing the kraal in a flood of tender ivory light. My thoughts strayed back over the gulf of years to other scenes and another clime; and in fancy I pictured how on just such a glorious night I had strolled by a moonlit river, with a maiden "divinely tall, and most divinely fair" by my side, and had sworn by Ashtaroth, Queen of Heaven, that neither time, nor space, nor the gorgeous East, with all its visions of splendor, should efface the memory of the sweet blue eyes that looked love into mine—when suddenly my reverie was rudely dispelled by a rush amongst the cattle, which brought my wandering senses back at once, for I knew what it portended. Up started the Badaga, and would have yelled, but I forced him back and put my hand over his mouth. The next instant a heavy body alighted on top of the hut. Needless to say it

was the tiger. The Badaga's face was a perfect study; his eyes were starting out of their sockets, his body was rigid, and there was no longer any necessity to stop his mouth—fear had struck him dumb. The tiger now began to sniff through an interstice between the stones overhead; he smelt the Badaga. I felt a bit "skeery" myself, and did not quite know what to do. At first I contemplated stepping out into the open and confronting the tiger; but a shot by moonlight is always risky, and a miss would have brought the tiger off to me in a twinkling. I tried hard to make his head out through the crevice, but could not succeed; so gently inserting the muzzle in the cranny where I heard the brute sniffing, I pulled the trigger. In that confined space the report was tremendous, and ditto the smoke; but, if my shot had no other effect, it restored his voice to the Badaga, who began to yell loud enough to frighten the d—l himself. Perfect silence succeeded, and, as nothing could be done till morning, I lay down to snatch a few hours' sleep, knowing that I could trust the Badaga to maintain a vigilant watch. At dawn I climbed up and examined the roof, but the only visible effect of my shot was a bit of stone chipped off the edge of one of the slabs. Whether the tiger was hit or not I do not know; I believe, myself, I must have fired just in front of his nose. My Badaga friend has never forgotten that night's adventure, and the mere mention of it, even after the lapse of time, makes his hair stand on end.

I could give several other instances to show that, when I am on the warpath on the Blue Hills, Dame Fortune makes the tigers her especial care; but my pen has had free play enough for once. However, we all know that fickleness is her chief attribute, and when next I pay a visit to the hills, as I think of doing in a month, perhaps she may greet me with a smile. For the present I live in hope.

Before ending this epistle I may note that local shikaris recognize two kinds of tigers as inhabiting the Nilgiris. They are not different species, and their structure is, of course, the same, but the difference in their food supply, and their methods of obtaining it, make a marked distinction in their habits and appearance. First, there is the cattle lifter, who restricts his excursions to the neighborhood of villages and takes life easily, levying a constant tribute on the village herds. He is always a large, heavy, handsome tiger. The game killer, pure and simple, on the other hand, is small compared with his cousin with the predilection for beef, and he dwells far from the madding crowd in the distant forests which form the chief haunts of deer and other game. Tempt him as you may, he will not look at a cow or buffalo, but whether from distaste or fear I cannot say. I should much like to know whether a similar "distinction without a difference" exists in the hill tracts in N. India, where tigers most do congregate.

Another correspondent writes:

"Some years ago, whilst shooting in India, a friend and myself were beating for a tiger along the banks of a river, then nearly dry. We had, as usual, tied out several young buffalo calves to tempt his striped majesty, and of these he had taken due toll, without, however, repaying us by affording a shot. He was a very leary customer, and up to every dodge of a hunted tiger. For three days we beat for him without any tangible result, though each day we put him up more than once. At one time he would slip off before we got to our posts; another he would lie close, and, jumping up, charge back through the beaters with a roar, and when he did break from the bank of the river he took very good care to cross at a spot that was practically out of range of us both. This game had gone on for three days, and on the third, toward evening, I witnessed what I am about to relate. After the previous night's "kill" all the *hailas*, or buffalo calves, had been taken in except one. This one was in a cool, shady spot in the bed of the river near a little pool of water, and not a hundred and fifty yards from where we had left our horses, as we intended riding back to camp after the beat. Our friend had pursued his usual aggravating tactics, and at last broke back, and, passing me where I could not fire, got behind my post. I knew he had gone back, as I just caught a glimpse of him, but too transient to risk a shot. Something prompted me to look back over my shoulder (I was

seated on the branch of a tree), and I presently saw the tiger slip into the bed of the river, take a look up and down and then begin to walk calmly across. Suddenly he stopped, crouched and then crept on toward where the calf was. He was rather far for a shot, and, besides, from my position I could not bring my rifle round. After creeping up to within about twenty yards of the *haila* he stopped, and, gathering himself together, gave two or three enormous bounds (I saw his footprints in the sand afterward and measured them); there was a momentary scuffle, a struggle, and the tiger slipped up the opposite bank and disappeared. So quietly had the whole thing happened that our syees holding the horses never even saw the tiger. On going up to the calf we found it dead, the rope that attached it to a tree broken and the tell-tale fang marks in its neck.

"Now there was no apparent reason why this tiger should have behaved in this manner, for he had had a good meal the previous evening, and I think his conduct can only be accounted for by the love of slaughter, for he went considerably out of his way to kill the wretched calf.

"We had to shift our camp the next day, and had to leave our friend, but in about a month we returned to find him in his old haunts, and after two days' more hide and seek he for once made a mistake, and passing almost under the tree in which I was posted, fell to four drams of powder and a twelve-bore bullet.

"Need I say that tiger's death was a sincere cause of congratulation, as he had cost us a small fortune in young buffaloes, one of which we considered he had sacrificed in a most ungentlemanly spirit."

TO A VIOLET FOUND BLOOMING IN NOVEMBER.

By Albert Bigelow Paine.

Pretty blossom, little stranger, with your modest eye of blue,
Why in this unusual season are you bravely blossoming?
Did you think the other flowers all had been deceiving you,
And because the day was sunny that it was return of spring?

Or perhaps you wished to see how the world looked at this season,
When companions of the springtime, birds and blossoms have all fled,
And the woods are brown and silent—tell me, have I guessed the reason!
And do you lament, sweet blossom, that you find your brothers dead?

Little violet, pretty stranger, bravely blossoming alone,
Prize you well the fleeting moment, for so brief will be your stay
That I fear it will have ended with the setting of the sun—
For the frosts will gather thickly o'er you ere another day.

You will wither, little blossom, when you feel its icy breath
Fall upon your tender petals that were just unclosed to-day,
As with me, in early youth-time, hope received a blow of death,
By the frosts of winter falling thickly on my head in May.

I am sorry, tender floweret, that so bravely you came hither,
When all other flowers have faded and the winter winds are nigh,
I am sorry, but 'tis only that you must so quickly wither—
Sorry that you left the bosom of your mother but to die.

A FEW HUMMING BIRD NOTES.

By Oliver.

These little sunbeams of birds, as the Western Indians called them, are only found in North and South America and the islands adjacent. They are more thickly distributed in the equatorial section, and are there known as "sun birds." The peculiar and often beautiful formation, and the iridescent coloration of their plumage, are characteristics that excite the wonder and admiration of all observers, naturalists and laymen. The long-tailed humming bird of Jamaica (*Trochilus polytmus*) is more transcendent in beauty of form and color than the celebrated emerald Paradise bird of New Guinea.

Some species range north to the Arctic regions and south to Patagonia, and from the level of the sea to the cold heights of the Andes, but, wherever found, the hues of emerald and ruby, and amethyst and topaz, flash from their beautiful forms. Everything in their organization contributes to give them great power and rapidity of flight, and they are able to balance themselves in the air or beside a flower with a facility which finds a parallel only among some of the insects. The bill is awl-shaped, thin, sharp-pointed, straight or curved. The tongue, which is split almost to its base, forming two hollow threads, can be protruded at will, and, while their main food is assuredly the distilled juice of flowers, they will not live when deprived entirely of insect food.

There are about 400 species of humming birds, but only six or seven are native to the United States. Among the most prominent species, estimated from the singular formation and color of their plumage, we find, first, the "long-tailed" humming bird, which is found only in Jamaica. The upper part of this beautiful creature is of a green color, glossed with gold; the wings are purple brown, and the tail, nearly three times longer than the body, is black, with a steel-blue reflection. Its length, including the tail, is about ten inches. Another remarkable species, not especially brilliant in plumage, is the "sword-bill," with a beak nearly as long as the rest of its body. The Copper-bellied, Puff-leg humming birds have a tuft of pure white, downy feathers, which envelope each leg, hence its name. The "White-booted Racket-tail" is another brilliant, and is noted for its remarkable swiftness of flight, darting like an arrow through the air. Many other species are deeply interesting, and their names also will suggest the brilliancy of their coloration. We name a few: Little flame-bearer, Princess Helena's coquette, the snow-cap, spangled coquette, the ruby, topaz, blue-tailed sylph, Cayenne fairy, and many others with characteristic names and beauty.

Whilst in their daring flight some of the wading birds cleave their way through the clouds and sweep a whole hemisphere, a little family of humming birds have only a rose bush for their universe. Like an elegant vase ornamented with lichens, a downy nest of cotton is balanced on the extremity of the most slender branch of the plant, whilst these aerial diamonds make prey of the insects which the flowers attract, or drink the pearls of dew which their petals distil. Such, Pouchet tells us, is the life of the sparkling-tailed humming bird. In the same manner, according to Gould, the "emeralds of Brazil," as they are commonly called, robed in changing green, set up their family nests upon the slender, pendent stems of the creepers, from the vicinity of which they never move. Rocked by the zephyr, the female broods tranquilly on her eggs, while her lord flits amorously near her; here are spent all the happy days of the gentle pair.

Family of Sparkling-tailed Humming Birds. Gould

THE SONG OF THE RUBY-CROWNED KINGLET.

By Dr. Morris Gibbs.

"A bird's song is the most beautiful music in the world." These are the words of my friend, Stewart White, and he echoes the sentiment at least of all refined lovers of Nature. It is not necessary that a person should be an ornithologist in order that one may appreciate the melody from Nature's conservatory. On the contrary, it happens lamentably often that individuals who aspire to a position of scientific fame as writers on the subject of birds, are sadly deficient in the comprehension of many points of interest alike pleasurable to the æsthete and utilitarian. Comprehensively, then, the songs of birds are to be studied by ornithologists and lovers of harmony in the woodlands and fields, and to those having cultivated the ear much pleasure is derived from observation and comparison of the various notes, even where the several performers are not identified. There is no study more pleasing to the stroller in our groves than to become acquainted with the voices of our feathered friends, not only in song, but in all moods and passions, represented by call notes indicative of love, excitement and fear. These call notes, as well as the songs, should be considered not only from the standpoint of musical superiority, but as well from the sentimentality emanating, as must result from associations with these delicate yet vivacious dwellers of our forests and fields. I can readily conceive that associations of a tender, refining nature, may be absent in some persons, but to the observer, the one who enjoys the many pleasures of out-door life, the songs of birds are ever a fruitful source of pleasing retrospection of agreeable days in the woodland.

One of the earliest songsters of merit which greet us in the latitude of New York City and well west on the parallel is the ruby-crowned kinglet. Coming as it does about April 20, often earlier, the medley of joyous notes are doubly welcome, and when heard on a cold, disagreeable day, the song seems to inspire one with hope in waiting for warmer days and fairer skies.

The song of this dainty, sprightly-winged gem, is a sweet warble of great penetration, but it is still in no way coarse or stridulous in any of its notes, and so ecstatic is the clear, rippling melody, that one has to pause and with visible anxiety listen to its repetition, if he be a lover of music and vivacious, changeable warblings. Never a break or flaw in the song of this bird, and the first note of morning is as clear and full as the last at sunset.

These true musicians of Nature have no need of practice to fit their voices for a woodland concert, and, even when all sing in chorus, there is not a false note uttered, though there may be twenty species in this choir of varied singers.

The ear of the true musician is from necessity attracted by the quavering, varied notes, as often as repeated by this sweet singer, and to my mind it takes a high rank for excellence among our many fine singing birds. The notes, as with most birds, are difficult to describe, but can be expressed with the pen, so that one familiar with the refined song can recognize it at a glance, even from this poor imitation. It begins with a few low, half-articulate notes, soft and melodious, rises to quite a pitch, and ends with a trembling, exquisitely-modulated warbling. It is unlike the song of any other bird of my acquaintance, and no comparison that the writer can draw could properly furnish a description of this elegant songster's ditty. In our inefficient way we may describe the notes on paper, trusting for leniency on the part of readers, and assuring those who are better educated in bird melodies than I that the interpretation is my best effort. The refrain runs in this wise: *Choi choi choi—qui qui qui—cheedledee chreedledee chreedledee.*

The notes begin and end abruptly, and often, when half finished, the song stops, and the active fellow gives voice to a few energetic staccato call notes.

The ruby-crown does not stop with us, being merely a transient in my State, and passing far to the north to nest. Of its nesting habits but very little is known, although the birds are abundant in their vernal and autumnal migrations.

A DAY AMONG THE KANGAROOS.

By William Senior.

Before the tablecloth had been removed I had learned to look upon the kangaroo as a downright pest in the thriving colony of Queensland, Australia. The talk had been of its ravages upon our host's pastures, and we had been all amused at the production, by one of the company, of an advertisement clipped from an English newspaper, designed to attract emigrants to the colony, and concluding with the words in capital type letters, "Liberty and Kangaroos!" Other attractions had been offered to the workingmen of the old country, but this last line, set out in conspicuous isolation, was evidently intended as a clincher. Kangaroos, indeed! That worthy Scotchman, our squatter host, hospitable to a fault, and shrewd as ever a North Briton could be, was full of the subject from quite another point of view. Kangaroos were no attraction to *him*.

"The emigrant agent at home," he said, helping himself to another banana, "seems to think the kangaroo a blessing. We, unfortunately, know it to be a curse. I have gone closely into the figures of the whole question, and can prove to you that every 1,000 kangaroos rob 2,000 sheep of grass, and this, at the present rate of wool, means a loss of 400 *l.* every year."

"But," said a member of the Legislative Assembly—smacking to sudden death a bloodthirsty mosquito that had settled on the back of his hand, and was rapidly filling out until its small body resembled a bead of crimson glass—"but the Government are taking the question up. They have passed a bill according to which ninepence will be paid for every kangaroo scalp and sixpence for every wallaby."

"Aye, and that is very good so far as it goes," rejoined the master, "but I was taught in dear auld Aberdeenshire that the best way to do a thing is to do it yourself. Why, sir, last month we had a three days' battue, and killed 3,000 marsupials, and if we have luck we shall shoot our thousand head to-morrow.

And, in truth, a very pleasant prospect it was. None of your wearisome walking for hours over mountain and glen for the bare glimpse of a stag which winds you every time you get within range. None of the perils of the tiger hunt in Indian jungles. Nay, none of the sickening brutality of the fashionable pigeon match. Here was an almost certainty of safe, plentiful sport, and, withal, the consciousness that you were all the time doing a work of necessity, and giving assistance to a worthy man whose theory in life had always been that heaven loves to help them who help themselves.

A loss of 400 *l.* every year? Well might one of us, as we went out to the verandah to smoke our pipes, gaze at the lovely purple tints stealing over the mountains, and become dreamy as the glorious stars of the southern hemisphere came out almost simultaneously with the sunset, exclaim, in the words of a never-forgotten favorite, "Four hundred pounds! Ma conscience!"

Our friend Cameron was adopting a wise course. The colony was in the midst of a terrible drought. Riding up to Glenlorne—the Australian colonies abound with sheep and cattle-runs bearing the name of some well-remembered scene of home—I had seen bullocks perishing and perished for lack of food and water, dying, perhaps, in the oozy mud of a nearly dried-up waterhole, having insufficient strength to extricate themselves. The heavens were as brass, the earth as iron. The grass was yellow, and dry as tinder, and ugly fissures were gaping in the parched earth. In the course of six hours I passed a dozen bush-fires. At such a time the kangaroos, driven from their mountain retreats, had advanced boldly to the haunts of civilization, and were, as the saying went, "eating up the country."

With a good heart, therefore, I uprose at dawn, and joined the band of hunters gathered for an organized attack on the enemy. To the half-a-dozen of us who were Cameron's guests at Glenlorne were now added neighbors, who had ridden in from a radius of twenty miles. In that sparsely populated country, where one

man's possession is as large as an English county, the muster would not be much even if it included the whole population; but we found ourselves twenty-five strong of armed men, and, what with black fellows and small settlers, there were between forty and fifty beaters on horseback.

What a hullabaloo there was, as we foregathered in the home paddock! Dogs were barking, men shouting, and there was much running to and fro. One man wanted a strap, another a length of greenhide to repair broken gear. The laughing jackasses in the scrub beyond the vineyard cachinnated one against the other, as only those comical birds can do. The pretty little blue-mountain parrots, flashing green, blue, and orange, screamed in their rapid flight overhead. Still higher, like pure white flecks against the serene blue of the cloudless sky, the cockatoos flocked to raid upon the Indian corn of some poor husbandman. The magpie fluted sweetly from the three gum trees by the milking yard. Far as the eye could reach, far as it would have reached had its powers been doubled, stretched the free forest of the Australian bush, with patches of clearing here and there; and, for the horizon, there were mountain ranges upon which the gauzy drapery of the night mists still lightly hovered. Words altogether fail to describe the sense of absolute freedom and delight felt by the healthy man at such a moment. His strength seems renewed like the eagle's. His chest expands as he draws a deep, sound breath, and thanks God that he is alive and that the world is so fair.

We had to reach those mountains and take up our positions upon the ridges and the spurs thereof. The beaters were to operate on the intervening flats and drive the game upward. It was my privilege to accompany both parties; to ride away with the beaters, and afterward join the firing party. The beaters, having a *détour* to accomplish, started first. We mounted, not in hot haste, but with the orderly leisure of men who wished to be thorough. In the bush you must learn to be your own groom when occasion requires; to catch your horse, bridle and saddle it, and mount with never a boy at its head holding the off-stirrup ready. In time the new chum becomes fond of doing so, and feels a pride in seeing for himself that the saddlecloth (often a simple piece of blanket) and girths are in order, and the bit and bridle comfortably disposed; also in being able, nimbly and safely, to mount a restless animal. Not one horse of our squadron had been stabled or groomed or corn-fed for many a day. Not one of the beaters wore coat or braces. The shirt and trousers, belt, and broad-brimmed hat, leggings, and more often one spur than two, completed the equipment, always adding the everlasting stock-whip.

Under the orders of our "boss," we in due time spread out over four or five miles of country, with instructions to make as much noise as we could after a certain interval had elapsed. The country over which we had to beat was more or less closely timbered, and there were small belts of scrub from which we knew there would be plenty of game to be dislodged. The general plan was to advance in a semi-circular line, so as to drive the marsupials toward a particular ridge for which they would be sure to make.

Within a mile of the home paddock behold them—kangaroos, wallabies, and even kangaroo rats—enjoying their morning meal, for their large pricked ears already betrayed a mild alarm. They had heard the crackling of dead branches as we rode toward them, and were discovered sitting on their haunches with their heads erect, and with one consent looking toward us. When the stock-whips began to crack, and the voices to resound far and near, they remained no more upon the order of their going, but went. You could see them bounding over the open spaces in their queer, half-upright position, with long balancing tails outstretched, and hear the dead wood creaking in the bits of scrub. The beaters were, as per instructions, first to advance at a walk, and only to begin the business in earnest when two shots, fired in quick succession from the ridge, gave the signal.

By taking a short cut, calculating my time, and using the spurs, I was able to keep company for a short distance with the beaters, and yet come up with the gunners, before the first shot was fired on the ridge. Guided by Billy

Barlow, a black fellow belonging to the station, this proved to be a most rousing gallop for a man who had previously had little experience of bush-life. Over fallen logs, down steep slopes, threading through the forest, now crouching upon the horse's neck to avoid a branch that would have brained you on the spot; now brushing past gum-tree trunks that it seemed impossible to avoid, Billy led the way at high racing speed, his legs and arms rivalling a windmill in motion, and his high-pitched whoop acting better than the sharpest spur upon the spirits of the plucky horses. Where the black fellow went I was bound to follow, and, drawing rein at the ridge, he showed his white teeth as the central feature of a beaming smile, and with an air of ineffable self-conceit chuckled, "That good fellow gallop, my word. Eh?"

Transferred now to the command of the leader of the firing party, a huge ironbark tree was assigned as my station, from which I was not to move. Moreover, as there was another sportsman 200 yards to the right, and another 200 yards to the left, the necessity of firing reasonably straight ahead was impressed upon me, as upon the rest. The little time to spare I employed in strolling along the line. The sportsmen were supremely happy. Those who had breech-loaders had heaped their cartridges conveniently at the foot of the tree, and fondled their weapons, lauding pinfire or central fire according to their respective possessions. The owners of muzzle-loaders, amongst which were some antique specimens that I should have trembled to discharge, were a little damped by the obvious disadvantage under which they labored, but were nevertheless eager and cheery, flattering themselves in one or two instances, with some reason too, that their guns were warranted to kill harder than the newer fashion.

At last the double-shotted signal rang out clear. The gunners stood to arms. The whips and shouts of the beaters could at first scarcely be heard, but they soon grew nearer. Acting under orders, we allowed the odd kangaroos composing the straggling advance guard to go by unhurt, and ought to have kept quiet until another double shot from our head-centre told us when to begin. But the kangaroos came on in such numbers that we were not to be restrained, and soon a fusilade worthy of a battlefield was opened. "Aim low, and single out your kangaroo," was, of course, the motto.

With small flocks of from four to a dozen bounding in a body toward you, the temptation to blaze at random into their midst was almost irresistible; but a few misses taught you the folly of the proceeding. It turned out to be a splendid drive. Hundreds of kangaroos rushed toward and past us. Some came on after being hit and fell, struggling but not killed, within a few yards of our posts. Others were literally rolled over and over down the ridge, until stopped by bush or tree. Rather than miss a chance, I fear some of us shot toward each other, eager to bring down the game as it was abreast us. I can answer for a rattling of spent shot on the tree beyond me, and the next man to the right more than hinted that some of my charges might be found in the bark of a eucalyptus not a hundred miles from where he stood. Whereupon we mutually congratulated each other upon our good fortune, and promised to behave better for the future.

The beaters had at last done their work, and were near us. Then only the file-firing ended. My first business when it ceased was to pick up a stick and despatch two unfortunate kangaroos whose hind legs had been broken, and who were in a pitiable state of disablement some twenty yards off. The poor creatures, inoffensive in all things except their natural appetites for the food provided for them, looked up with such liquid beautiful eyes, full of distress and pleading, that for a time I dared not put them out of their pain. It did seem terribly cruel, but, alas! that loss of 400 *l.* a year, and the remembrance of havoc amongst the cultivated acres of selectors to whom the loss of even 400 *s.* would be a most serious matter, appeared to justify this wholesale taking of life. Still, the consciousness that we were doing a work of necessity for our squatter friend, and for the frugal selector and his family, could not put me wholly at ease in the face of that reproachful glance. It was the one drawback to a day's exciting sport.

During the day we had three drives similar to this, but none quite equal in results. The first drive had wrought wholesale slaughter. The breech-loaders had naturally given the best account of the foe. Some of the gun barrels became too hot to touch. One expert at the work, never moving from his appointed stand, had fired fifty cartridges, and shot forty-three marsupials. The lowest number killed by a gun was eight. How around each tree the empty cartridges lay strewed; how all along the ridge the smell of gunpowder and wreaths of smoke pervaded the air; how black fellows and boys with sharp knives whipped off the scalps of the slain, carefully leaving the ears attached, and strung them together; how the begrimed barrels were cleaned out, perspiring faces mopped, and incidents exchanged over happy pipes, as we lay prone upon the ground for a brief spell previous to starting afresh, let the reader imagine for himself.

Of the kangaroo tribes which fell that day there numbered 921, and of animals wounded to die in lingering pain or to recover as best they could, there must have been a great quantity. The B. B. shot scatters wide with most guns, and out of a flying group of half a dozen, probably not one would escape without a pellet. The number of animals driven before our beaters was incredibly great, and I was not at all surprised to hear afterward that upon another station in the same district 23,000 kangaroos were shot during one year. Upon the day with which we have been concerning ourselves some of the rarer species were found amongst the slain. It is said that in Australia there are between twenty and thirty kinds of kangaroo. The varieties which we secured were, first, the common kangaroo, and the largest, which was what the colonials term an "old man" kangaroo, was much above the average. Sitting upright he would have been nearly six feet high, and his big tapering tail could not have weighed less than fourteen pounds. Secondly, came the smaller wallabies, of which there were three kinds, namely—the common scrub wallaby, the rock wallaby, which is darker in color and more handsome, and there was one black wallaby, so scarce that it was next day despatched to one of the other colonies for preservation in a museum. Thirdly, we had a few paddy-melons, a still smaller variety than the wallaby; fourthly, a brace of kangaroo rats; and lastly one wallaroo.

Touching the rats, they must have been accidentally shot; as their scalps do not bring a bonus, and they are no bigger than a wild rabbit, no one would think of knowingly wasting a shot upon them. The wallaroo is quite another affair. This is the most valuable example of the order *Marsupialia*. It inhabits mountainous districts and is seldom found. The fur is a rich dark brown, and fetches a high price. The specimen amongst our spoil must have wandered from its native haunts in error, and Billy Barlow was not wrong in applying to him the term "boomer," which, all through the colonies, signifies something preternaturally large. Thus a polite youth will inform a friend who has drawn a very long bow, not that he has told a wicked falsehood, but a down-right boomer.

It seemed a pity to leave so many carcasses lying on the ground to be the food of carrion birds, voracious ants, and prowling dingoes, but in a country where the scarcity of labor is a huge difficulty meeting the colonist at every turn, it would not pay even to remove the skins. Yet the fur, chosen at the right time of year, makes a most serviceable rug, and the most comfortable boots I have ever worn were made of kangaroo leather. The meat is held of little account. Wallaby haunch jugged, or the whiter paddy-melon curried, make a welcome change to salt beef from the harness cask; and the tail of the large kangaroo has a certain fame for soup, although one hears more about it at home than in the land of the marsupials. Some day, no doubt, the hundreds of thousands of skins that may be secured every year will find their value. At present they are virtually wasted, though the value of the leather is slowly becoming better known.

The reader may now form some idea of a days' sport at the Antipodes. Not the least pleasant feature was our halt for luncheon. The spot selected was a thick scrub into which even the fierce sun which made the glass

register 100° in the shade could not penetrate. Of bread and damper there was no stint; cold boiled beef, in joints and pieces of the cut-and-come-again order, was plentiful. Tea, strong, fragrant, and sweet, we brewed in buckets over the camp fire, and drank without milk, after the fashion of all orthodox bushman, dipping our pannikins, which each man had brought strapped to his saddle, into the common pail.

Our sheath-knives were our sole cutlery, and crockeryware troubled us not. Talk of lord mayor's feasts! Blessed indeed would be lord mayors, aldermen, and all people committed to their charge if they could relish their food as we relished that unpretentious repast in the Australian forest. True, there were a few mosquitoes about. One venerable gentleman leaped with surprising agility to his feet after being nipped rudely by the forceps of a bull-dog-ant upon which he had innocently sat; and attention, as the feast drew near its close, was called to a disagreeable-looking iguana over a yard long, which had been watching us from one of the upper branches of a tree, and which dropped very dead to a salute from Billy Barlow's single-barrelled gun. Billy carefully selected certain fatty portions to which he had in his piccaninny days been taught to ascribe almost supernatural curative powers.

With the breaking up of the drought I may mention as a postscript, the plague of marsupials moderated, but as the bonuses for scalps were also reduced in value the energetic measures which had been entered into for the destruction of kangaroos were allowed to lapse. The natural timidity of the animal as a rule ensures its retreat before civilization, and the colonist who does not travel into the bush sees but little of the singular animal which so astonished Captain Cook and his merry men. But the danger from the millions of marsupials which still exist is such that in some badly-infested districts the landholders were not long since warned by the local authorities that, if they did not destroy them, they would be destroyed by officially-employed men at their (the landholders') expense. Pastoral lessees should adopt Sandy Cameron's principles, for, at Glenlorne, the nuisance was, after my visit, reduced to a minimum by his vigorous onslaughts, made on that grand self-help principle which has given him a fortune beyond the dreams of avarice.

THE AQUARIUM.

CONDUCTED BY HUGO MULERTT.

[The Editor of this Department will cheerfully answer all queries relative to the conduct of Aquaria.]

The Water Cabinet.

The aquarium has not only spread abroad a love for natural history; it has also increased the facilities for the study of Nature by removing the difficulties which have hitherto attended the preservation, for any length of time, of living specimens of aquatic life. The tank had scarcely taken its place among the resources for pleasurable recreation and scientific study when the field of culture extended itself, and every variety of minute life found in the waters came to have its share of attention for the general profit and delight of the studious. The ordinary tank was found insufficient for the wants of the aquarist, and, wherever a large vessel was to be seen stocked with fresh-water fishes or marine objects, a collection of small jars, phials or show glasses was pretty sure to be found also.

In an aquarium we may group together many dissimilar objects, but it must be evident to the most superficial observer that, when immersed in a large body of water with other creatures, many objects are ill placed for examination, especially if we use the microscope. Hence, where the study is pursued with any degree of ardor, some special arrangements are necessary to enable us to keep in a healthy state, and in a way that admits a close scrutiny at any moment, such of the smaller aquatic objects as most commend themselves for beauty or scientific interest.

Many beginners, unable to resist the temptation of a jar of beetles or a collection of larva, and having no other means of keeping them, have placed them in the tank to mingle with the stock of finny creatures, and have thereby either lost the better part of the collection or have been compelled to break up the stock and begin anew. A few species of water beetles and aquatic larva may be safely preserved in an aquarium, but an aquarium is by no means the best place for them if we wish to study their habits closely or investigate their mechanism and economy by the aid of lenses; all insects, many mollusks, larva and other small objects should be kept apart, and a collection of such objects is what we mean by a water cabinet.

To the genuine student there is really more for remunerative study in such a collection than can be found in the aquarium, though the tank, whether river or marine, will always prove most attractive as an ornament, and, because it requires less care and study, will be pretty sure to retain the greatest number of admirers. But the aquarium and the cabinet are distinct things; they cannot be combined in the same vessel, and, though a water cabinet is but another form, or rather a series of separate and smaller aquaria, the uses and economies of each are in a great measure distinct. It is possible to cultivate either without the other, though we should generally expect to find them in company, the cabinet being a growth or extension of the aquarium.

Construction of a Cabinet.—Ingenuity, under the control of circumstances, will devise many modes of preserving the smaller specimens of aquatic life, and we shall here describe a plan which, we think, will be found most generally useful, particularly as it may have a very simple form and be produced for a very trifling outlay; or may be elaborated into a noble piece of furniture for the adornment of an elegantly furnished room.

If we describe the measurements of our own cabinet it may serve as a guide to any who may desire to have one constructed of a similar pattern, though, as a matter of course, the plan admits of endless modifications, to suit the means of the student or the position in which such a cabinet is to be placed.

The table measures nineteen inches from back to front across the centre drawer, and from back to front across the two side drawers,

twelve inches. On this is placed a row of seven-inch cylindrical glasses of clear flint glass, and in the centre, behind the jars, stands a twelve-inch, bell-glass aquarium, to be stocked with choice fishes or superfluous cabinet specimens. The first shelf has a breadth of eight inches to receive a row of six-inch glasses; the second shelf a breadth of five inches, and the jars upon it measure four inches in diameter. The top shelf is only three and a half inches wide, and the glasses measure three inches across the top. The entire frame work has a breadth of about thirty-two inches, and a height, from the floor of the room to the level of the top shelf, of about sixty-six inches.

The breadth and height of the window in which the cabinet is to be placed must have the first consideration with any one who may intend to construct such a piece of furniture; the respective sizes of the vessels must be an after consideration, because, unless the whole be so adapted as that it shall enjoy a full share of uninterrupted daylight, very little progress can be effected, especially if the growth of the more delicate forms of aquatic vegetation be attempted.

In the absence of a properly constructed set of shelves, a few plain ones may be fitted up in a window. A single strip of deal, on brackets, would afford room for a dozen jars, and in these, by judicious groupings, specimens of from fifty to a hundred kinds could be kept, whether for observation by the naked eye or the microscope.

Our jars are now stocked with minute aquatic plants, beetles of several species, diving spiders, water worms and mites, larva of beetles and flies, tadpoles in progress of transformation, mollusks of choice kinds and spawn of all kinds, removed from the tanks. Species that do not agree may be introduced to the bell glass, for the sake of teaching us the nature and incidents of the strife maintained in the great world out of doors; the battle may there have its way, and we may study destruction with as much profit as we may the momentary creation, by which the system of Nature is maintained in its completeness. In fact, the bell glass is a reservoir into which we may dip for almost anything we want to fill up vacancies in the jars, and to which we may consign the superfluities of a day's collecting, having first assorted and set apart such as are wanted for separate observation and study.

Aquaria Glasses Turning Green.

Do you know of any preventive against the glasses turning green with a slimy substance if the water is not changed for some weeks. I have a good deal of trouble, and it is about the most disagreeable thing in keeping an aquarium arranged nicely. F. L. L.

Your aquarium gets evidently too much light. Move it about twelve inches back from the window, toward the room, and let no sun shine against the glass. Once or twice a week wipe the inside of the glass with a small rough sponge tied to a stick.

Aquarium Troubles.

I herewith send another sketch showing location of my aquarium, and I will also give a further account of my management of it as well as I can. As I wrote in my previous letter, my aquarium is about 40 inches long, 16 inches deep and 18 inches wide. I have in the bottom cleanly washed sand and very small pebbles; in a common earthen flower jar, completely submerged in the water, a calla; no earth in the jar, nothing but fine sand. I also have a little moss, the variety of which you may be able to recognize from sample enclosed. Since I received your letter I have added some larger pebbles, as you intimated they were necessary. I have forty or fifty fish, mostly goldfish, averaging about four inches long. Of the native fish I have one-half dozen catfish about one inch long; the balance of my natives are small common brook fish. The water keeps a kind of green color and frequently smells badly. It hardly ever, if at all, looks, or has, a milky color. I guess my feeding is wrong, for *I feed them very seldom in winter*, only about twice a week, and this winter I have fed them nothing but raw beef scraped fine from a large piece; but I have always been careful to give them just what they would eat and no more. However, I gave them prepared fish food last winter and I had the same bad luck about keeping the water clear. Almost every day toward evening the fish begin to come to the surface of the water, but in the morning they will be at the bottom swimming about feeding and apparently enjoying themselves very much. The four sides of my aquarium are glass. Should I clean out the aquarium when the water is in its present condition, or should I take out and throw away the water and sand pebbles and replace everything new? And should I let the new water stand some time before returning the fish?

I trust that with your information I may yet succeed with my aquarium. F. P. T.

The capacity of your aquarium is about forty-five gallons. You have, in our judgment, about forty gallons of water in it. For the number of fish that you keep this is an in-

sufficient quantity. Reduce the number to about thirty, introduce two or three more species of aquatic plants, also some Tuffstone rock work, and you will find that your tank looks as good, even better, than before, and the remaining fish will thrive better.

That your fish rise to the surface and are in distress in the evening, while they are at the bottom and apparently comfortable in the morning, seems to prove that they have not the proper amount of oxygen. The burning gas in your office consumes most of the oxygen contained in the atmosphere, and the water can therefore absorb but little.

The best way will be to empty your tank. Clean the bottom and the (inside) glass sides with common table salt, using your wet hand instead of a sponge or rag. Wash the sand and pebbles in several waters, then replace. Plant the plants, place the rock work and arrange a couple of handfuls of pretty good sized pebbles here and there over the sand, taking care, however, to place the individual pebbles not too close to each other. There are to be little spaces, cavities, on the bottom of an aquarium wherein the excrements of the fish and other loose particles can collect, so the fish while swimming near the bottom cannot mix these again and again with the water. This is the mission pebbles have to fulfil in an aquarium.

Everything replaced carefully, refill your tank, making the water the same temperature the fish are accustomed to, add a teaspoonful of table salt and reintroduce the fish, together with about a dozen of frog tadpoles, which act as scavengers.

Once in a while the sediment that collects between the pebbles should be removed by aid of a siphon. Let your aquarium have no sunlight.

The plant of which you sent a sprig in your letter is the common wax or hornwort (*Ceratophyllum demersum*, from keras—the horn or wax, and phyllum, the leaf, owing to the waxy or horny texture of the plant). It is a good oxygenator, although one of our commonest native aquatic plants.

NOTES AND QUERIES.

[Under this Department Heading queries relative to all branches of Natural History will be answered.]

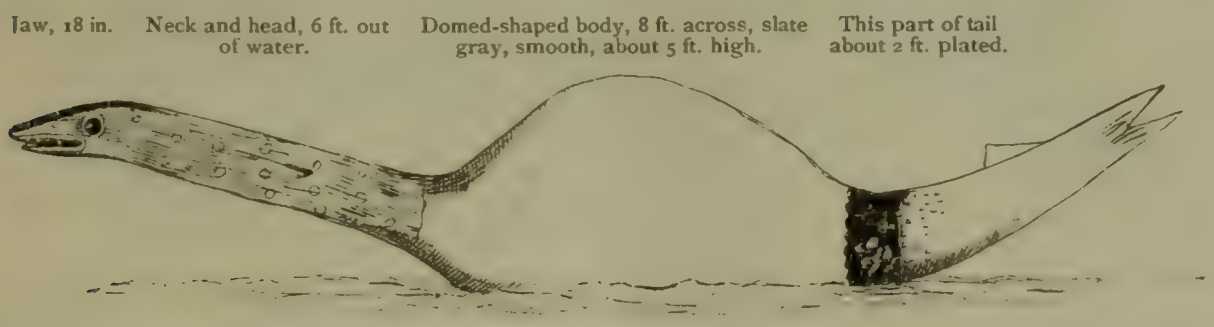
The Great Turtle of Australia.

An Australian lady sends to *Land and Water*, from Queensland, a description of a monster turtle and an outline drawing of it, both of which we append :

"We have had a visit from a monster turtle fish. I send a sketch of it. It let me stand for half an hour within five feet of it. When tired of my looking at it, it put its long neck and head into the water and swept around seaward, raising its huge dome-shaped body about five feet out of water, and put its twelve feet of fish-like tail over the dry shore, elevating it at an angle. Then, giving its tail a half twist, it shot off like a flash of lightning, and I saw its tail in the air about a quarter of a mile off, where the steamers anchor. It has either teeth or serrated jaw-bones. Native blacks call it 'Moka, moka,' and say they like to eat it, and that it has legs and fingers. I did not see its legs, as they were in the water. What I saw of it was about twenty-seven or twenty-eight feet, but I think it must be thirty feet in all. Whilst its head was out of the water it kept its mouth open, and, as I could not see any nostrils, I fancy it breathes through its mouth. The jaws are about eighteen inches in length ; the head and neck greenish white, with large white spots on the neck, and a band of white round a very black eye and round upper and lower jaw. The body was dome-shaped, about eight feet across and five feet high, smooth and slate gray in color. Tail about twelve feet, the fish part wedge-shaped and fin of chocolate brown ; then beautiful sides shading to white ; scales size of thumb nail."

To which the editor responds :

"In the opinion of the authorities this turtle is the *Carettochelys*, a monster turtle known to exist at the mouth of the Fly River, New Guinea, which has a very long neck. The museum at Sydney possesses the only known preserved specimen, and that is a dry one. The length and shape of the tail, as described, are, however, impossible, as no turtles have caudal appendages corresponding to the description, and the fair observer must have been mistaken on this very important point. Neither have turtles teeth, though the other points would correspond to the *Carettochelys*. We may add that the authorities at South Kensington are most anxious to obtain a specimen of the *Carettochelys*, and have offered a very handsome sum for a specimen, or even a part of one, which may lead to its further identification. The question is undoubtedly of interest to lovers of natural history."


Jaw, 18 in.
Neck and head, 6 ft. out of water.
Domed-shaped body, 8 ft. across, slate gray, smooth, about 5 ft. high.
This part of tail about 2 ft. plated.
Color, greenish white ; large, round, white spots; thick cord of chalk white round very black eye and round both jaws.
Tail, about 12 ft. ; fish point of tail wedge shape and fin of a chocolate brown ; then beautiful sides shading to white; scales size of thumb nails.

A Curious Snake.

In the fall of 1869 I was in La Crosse, Wis., and having some business in La Crescent, on the Minnesota site of the Mississippi, I crossed the river in a ferry boat. There is, or was, an arm of the river on the Minnesota side, called in western parlance a "slew." Over this there is a bridge; on going over it I saw a snake coiled on a "butt" that had been sawed off a tree of about two feet in diameter, and it was floating in the water. The snake was so different from any animal of the kind I had ever before seen that I gazed on it for fully five minutes. It was evidently asleep and within ten feet of me—was, in fact, directly under me as I leaned over the side of the bridge. The "slew" had no current in it, for the water was very low; I had, therefore, ample opportunity to observe the snake. It was red, and more extraordinary still, it was thickly covered with hair. It resembled no snake I had ever seen before. It was exactly like a red cow's tail. The hair on it was fully an inch long and as thick as that growing on a cow's tail. Having no means of capturing the snake, I determined to make it show itself, and flung a piece of stick at it. It awoke at the splash in the water, uncoiled itself and dived into the "slew." It was certainly six feet long or more.

Can any reader of NATURE'S REALM say if such a snake has ever been seen in any of our western rivers? I have told some dozens of people in La Crosse about it, among them Mr. Davidson, of the Clyde House, but none of them remembered to have ever seen such a snake. Mr. Davidson is the best known sportsman in La Crosse, and it is strange that he never should have seen any snake like it.

T. O. Russell.

The Sky Lark.

Can NATURE'S REALM or any of its readers inform me if any serious effort has yet been made by the general government, a State government or a private individual, to import the sky lark? Judging from an article that appeared in *Nature* some months ago, one would think that this most noted and interesting of birds would find a genial habitat in many places on this continent. For my part I see nothing whatever to hinder the sky lark from living and thriving all along our Atlantic seaboard from New York to North Carolina. The sky lark is not altogether a granivorous bird; it feeds principally on grubs and worms. It is hardy and can stand great varieties of temperature. It is found in parts of continental Europe where the climate is quite as severe as on our Atlantic seaboard between the points mentioned. The sky lark is a bird of great power of flight, and were it once acclimated here it would soon learn to emigrate from one locality to another as it does in Europe. It is well known that these birds cross the sea to the British Isles in vast numbers every autumn from the more northerly parts of continental Europe, where the winters are much more severe than in Great Britain or Ireland.

There is at least one part of this continent where the sky lark would certainly live and thrive if introduced, and that is on the Pacific coast between Vancouver's Island and latitude 35° north. The climate of this part of the American continent is almost the same as that of western and southwestern Europe—the natural country of the sky lark. Without government aid it will be, in my opinion, impossible to plant the sky lark in America. Vast numbers of the young birds would have to be brought over and let loose in different localities. There would be very little difficulty in procuring any number of them in almost any part of Europe. They are caught in nets in the fall of the year by hundreds of thousands and sold to poulterers and butchers. Heaven forbid, however, that Americans should ever become sky lark eaters! We want the bird for its song and not for its flesh.

There is no possible cause to fear that the sky lark would become a nuisance in this country if domiciled in it. It causes absolutely no damage in the countries it inhabits, for it is more of a grub than a grain eater.

It is to be ardently desired that NATURE'S REALM and all publications of a kindred nature in this country will not cease agitating the subject until the general government takes some steps about introducing the sky lark and giving it a new home in America. R.

Two West African Fishes.

"Sarcelle."—We have had the photographs you sent us reproduced. Fig. 1 represents the *Pagrus unicolor*, Günther. It does not reach American waters, being found most frequently on the western coast of Africa. It is allied to the "snapper" and "porgy" of our waters. Dr. David S. Jordan gives it the scientific name of *Sparus unicolor*.

Fig. 2 represents another non-American fish, *Lithia vadigo*, which belongs to the family of horse mackerels or tunnies. With the genus *Lithia* ichthyologists are not entirely familiar, and Günther dismisses it with a few lines. In our Atlantic waters we have several species of the horse mackerel, but, although many of them are taken by the market fishermen, they are not esteemed as food, although highly prized as such in the Old World from the time of the ancient Romans to the present day.

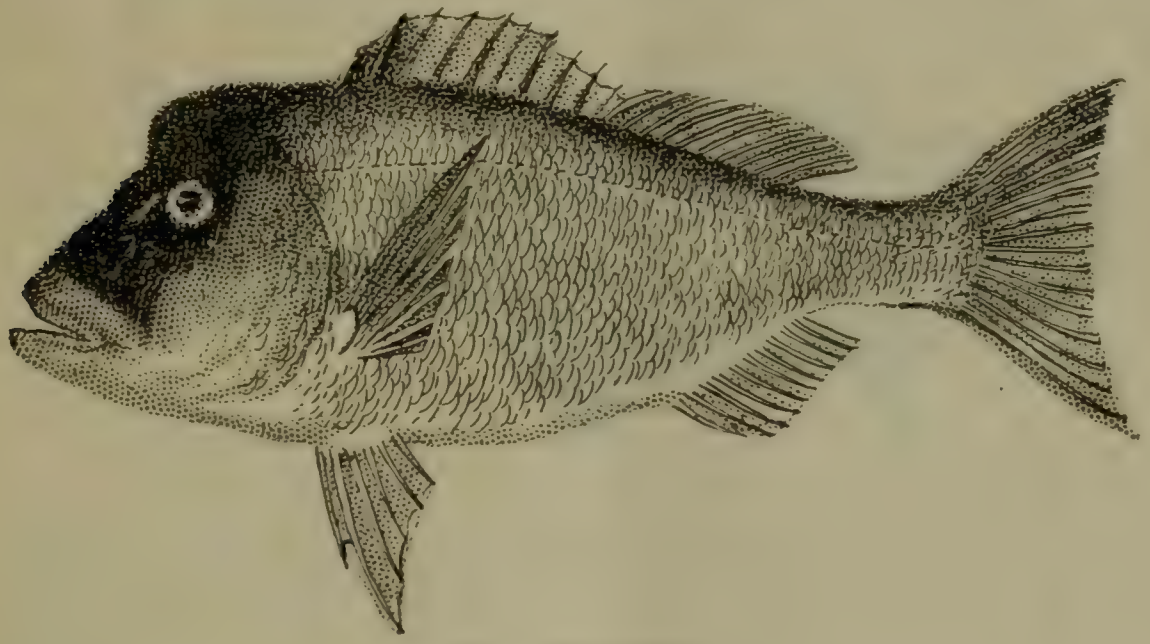


Fig. 1.—*Pagrus unicolor.*

The Claw in the Lion's Tail.

Quite an interesting correspondence, *pro* and *con*, as to the existence of a claw in the tuft of a lion's tail, is now being printed in our London exchanges. We excerpt the most important paragraphs:

"I have seen it stated in an old natural history book that instances have been known in which lions were found to have a small claw or prickle attached to the tips of their tails. After stating that it has long been a popular, though erroneous, impression that lions and lionesses lash themselves with their tails to stimulate their rage, and that they were furnished with this prickle at the termination of the caudal appendage in order to do so, the writer goes on to observe:

"'Mr. Bennett detected it in the tip of the tail of a young Barbary lion. Blumenbach had previously ascertained the fact of its existence in a specimen examined by himself in 1829. Monsieur Deshayes announced the existence of this prickle in a lion and lioness which died in the Paris Menagerie. Mr. Woods detected it only once out of numerous lions which he purposely examined. He also found a similar prickle on the tail of an Asiatic leopard. This prickle is in fact only occasionally present. It is not connected with the caudal vertebræ, but, as Mr. Woods says, appears to be inserted into the skin like the bulb of a bristle; but Monsieur Deshayes asserts that it is of a conical shape, and adheres to the skin by its base, as does also Blumenbach. We are inclined to think that it is nothing more than indurated and partially detached cuticle. Certainly it falls off on the slightest touch.'

"I think, if this latter is a fact, it is very cu-

rious, for any one who has any knowledge of the felines must know that they use considerable force when lashing their tails. What I should like to know therefore is: First, has Mr. Parker Gilmore, or any of your readers who have killed lions or leopards, observed the existence of this prickle? Secondly, does it come off on the death of the animal? Thirdly, what, in their opinion, is its use? Fourthly, is it straight or curved?

"I have assisted in the skinning of several tigers and panthers, and cannot say that I ever observed the existence of this prickle; but, as the writer whom I have quoted above says that it occurs only in comparatively rare cases, this is not to be wondered at."

animals themselves have an excess of stern action, now much modified in our modern beauties.

"That this callosity should fall off soon after the death of its late proprietor I can quite believe, for I noticed during native wars in South Africa that, after a victim had lain dead several hours, the callow skin on the soles of the slain commenced to detach itself. Many of our officers who served in Zululand can attest the truth of this statement.

"As to lions stimulating themselves into anger by lashing their flanks—well, it is as true as the babyroussa yarn told Goldsmith. When a lion charges it carries its tail almost horizontally with the ground and stiff as a

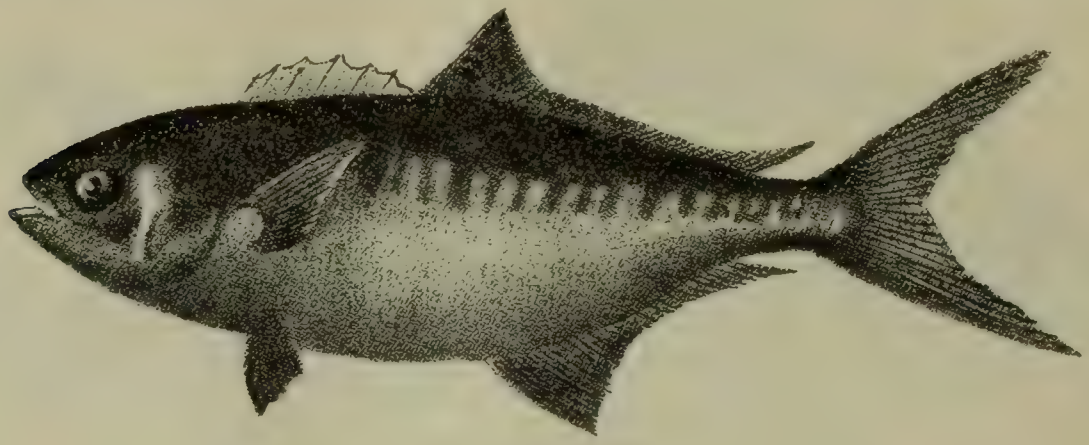


FIG. 2.—*Lithia vadigo.*

To which another writer responds:

"With regard to the spike on the tip of the lion's tail, there are just the slightest, most flimsy grounds that can possibly be imagined for such a supposition. And they are the following: Aged animals of this species, and of both sexes, have a callous termination to the tuft, and hidden by the long hair, which may be designated a callosity. This is doubtless caused by the tail coming in contact with brush and other hard substances when rapidly moved to and fro. The same can frequently be observed on dogs, especially among pointers of the old school and land spaniels of the present date, and, doubtless, from this arose the habit of removing two or three terminal joints of the *vertebræ* of these breeds. In Southern France and Spain this custom still prevails in regard to pointers; but their dogs are constantly used in thick cover, while the mop-handle. Just previous, or when contemplating charging, the tail is considerably elevated over the horizontal line and entirely destitute of any movement. However, if the observer be sufficiently close, a twitching motion may be noted in the half-recumbent ears of the intending aggressive beast."

THE FLOWER CLOCK.

The hour at which each flower opens is itself so uniform that, by watching them, floral clocks of sufficient accuracy can be arranged. Father Kircher had dreamed of it, but vaguely and without pointing out anything; it is to Linnæus that we must ascribe the ingenious idea of indicating all the hours by the time at which plants open or shut their corollas. The Swedish botanist had created a flower clock for the climate which he inhabited; but, as in our

latitudes, a more brilliant and radiant dawn makes the flowers earlier. Lamarck was obliged to construct for France another clock, which is a little in advance of the Swedish one. We quote from Pouchet:

HOURS AT WHICH THE FLOWERS OPEN.	PLANTS ON WHICH THE OBSERVATIONS WERE MADE.
MORNING.	
3 to 5 o'clock,	Tragopogon pratense (yellow goats-beard or salsify).
4 to 5 "	Cichorium intybus (chicory).
5 "	Sonchus oleraceus (sow-thistle.
5 to 6 "	Leontodon taraxacum (dandelion.
6 "	Hieracium umbellatum umbellate hawkweed.
6 to 7 "	Hieracium murorum (wall hawk-weed).
7 "	Lactuca sativa (lettuce).
7 "	Nymphæa alba (white water lily.
7 to 8 "	Mesembryanthemum barbatum.
8 "	Anagallis arvensis (field pimpernel or poor man's weather glass).
9 "	Calendula arvensis (field marigold.
9 to 10 "	Mesembryanthemum crystallinum ice plant).
10 to 11 "	Mesembryanthemum nodiflorum.
EVENING.	
5 o'clock,	Nyctago hortensis.
6 "	Geranium triste.
6 "	Silene noctiflora.
9 to 10 o'clock,	Cactus grandiflorus.

Can Dogs Talk?

At the Box Hotel in Crookston, Minn., some six years ago, my attention was more than once called to two dogs that were allowed to loiter about in the hotel office. These dogs were the greatest of friends; in fact, so "chummy" as to call forth admiration from the various hotel guests. So prints the Kansas City *Star*.

One afternoon one of the dogs, which had been basking in the sun on the floor of the office, suddenly gave a bound and started for the door. I immediately stepped to the door and opened it, and the dog passed out, going in the direction of the Manitoba depot, where I observed some ten or twenty other dogs holding a pow-wow. Then I closed the door and resumed my seat. Immediately I heard a terrible commotion in the direction in which the dog had gone. Stepping to the door I observed that a full-fledged dog fight had begun. Arriving at the scene of the battle I found that my dog friend of a few minutes previous was the under brute in a big fracas. He was howling with pain, while a big Newfoundland dog stood over him making the fur fly. A blow on the canine's cranium from a ball club in the hands of a small urchin who stood hard by, soon put a stop to the Newfoundland's ferocity. The under brute started for home pell mell, and when I arrived at the hotel I found the poor brute at the office door, bleeding and bruised, awaiting admission. I opened the door and passed into the office, the dog following me.

Lying on the floor, in close proximity to the office stove, reposed the sleeping carcass of my little bested friend's companion. He was a large brute of the mongrel species—a cross between a bulldog and a mastiff. The poor, conquered brute, upon entering the office proceeded in the direction in which his dog friend lay stretched upon the floor, and, going up to him, commenced to sniff at him from head to foot. Presently the sleeping dog rose to a sitting position, and, gazing at his conquered friend some two or three minutes, seemed to take in the situation at once—that his dogship had but lately received a terrible whipping. After a little more sniffing on the part of the conquered brute, both dogs started toward the door. I stepped to the door, opened it, and the dogs passed out. Both dogs started in the direction of the depot platform, some 400 or 500 feet south of the hotel, where they espied several dogs, among their number being the big Newfoundland, the object of their vengeance. Going up to the big Newfoundland dog, my little conquered friend curled up his tail and commenced to growl, the big Newfoundland dog likewise, each dog going round and round in a circuitous route while thus parleying, the big hotel dog in the meantime standing hard by watching proceedings. Presently the big hotel dog gave a spring and landed a good hold on the jaw of his big opponent. Both dogs reared in the air, the Newfoundland coming down the under dog, and the chewing he received in that fracas I suppose he never forgot, my little conquered friend nipping the big rascal from behind at every chance presenting itself. To be candid about it, the hair from the hide of that poor martyred Newfoundland actually filled the air, and a worse whipped dog never slunk from the field of battle.

Answers to Correspondents.

"Youngster" asks why a dog generally turns around three or four times before he lies down to sleep? It is supposed that this singular and almost invariable practice is one of the dog's natural instincts, altered or modified to his domesticated life; for, when in a wild state, he takes up his night's quarters in a field of tall, withered grass, or among reeds or rushes; thus, wheeling round, he separates the vegetation in the spot where he is to lie, and forms a bed with overhanging curtains all around for his protection and warmth.

"C. L. R." is interested in the variety of motions that the trunk of an elephant has the power to make, and asks the reason why this is so. We answer: There are a great number of muscles in an elephant's trunk. They have their insertion in the external coverings of the trunk, and they lie in a great variety of directions, some longitudinal, some nearly circular and others oblique. They number no less than 4,000, which is considerably greater than the number in the whole human body. Maunder writes: "The trunk of the elephant may justly be considered as one of the miracles of Nature, being at once the organ of respiration as well as the instrument by which the animal supplies itself with food. Nearly eight feet in length, endowed with exquisite sensibility, and stout in proportion to the massive size of the animal, this organ will uproot trees or gather grass—raise a piece of artillery or take up a nut, kill a man or brush off a fly. It conveys the food to the mouth and pumps up enormous draughts of water, which, by its recurvature, are turned into and driven down the capacious throat or showered over the body. Its length supplies the place of a long neck, which would have been incompatible with the support of the large head and weighty tusks. A glance at the head of an elephant will show the thickness and strength of the trunk at its insertion, and the massy, arched bones of the face, and thick, muscular neck, are admirably adapted for supporting and working this powerful and wonderful instrument."

"Amateur," who is interested in the albino question, will doubtless be so in the following description of a swallow with pure white plumage. It will add to his elaborate notes on this subject, which he kindly promises to put into shape and give them to the readers of NATURE'S REALM: "Ornithologists in Paris are much interested in the discovery of a rare bird in the shape of a snow-white swallow. This novel specimen of the feathered tribe came to life lately in a nest which was built by the parent bird under the eaves of a glass roof covering a court in the extensive manufactory of a tradesman residing in the district of Grenelle. The white bird was born with two black specimens, one of which flew away as soon as it was fledged, whereupon the tradesman, in order to keep the other two, transformed the glass-roofed court into a temporary aviary. Photographs have been taken of the snow-white swallow and will be sent to the leading naturalists of the city. One of them went to Grenelle in order to study the feathered curiosity. This gentleman was, however, too late to see the bird alive. It perished, probably, because too much care was taken of it or through fright at the number of people who came to stare at it as a natural curiosity. The dead bird will now be stuffed and sent to the museum of the Botanical Gardens, where there is already a white magpie, which still lives and hops about among its companions, from which it only differs in color."

A correspondent, "J. G. W.," asks us what term is applied to a number of peacocks when gathered together. We reply, "a muster of peacocks," and, as the subject is an interesting one, we append the generally accepted terms for groups of animals, according to an English authority: "A herd of swine, a skulk of foxes, a pack of wolves, a drove of oxen or cattle, a sounder of hogs, a troop of monkeys, a pride of lions, a sleuth of bears, a band of horses, a herd of ponies, a covey of partridges, a nide of pheasants, a wisp of snipe, a school of whales, a shoal of herrings, a run of fish, a flight of doves, a siege of herons, a building of rooks, a brood of grouse, a swarm of bees, gnats, flies, etc., a stand of flowers, a watch of nightingales, a cast of hawks, a flock of geese, sheep, goats, etc., a bevy of girls, a gallery of stars and a crowd of men or boys."

In the Woods.

The eye may catch, thro' foliage densely green,
Glimpses of streams that flow thro' banks serene,
Foaming o'er rocks or dashing 'neath a line
(By Nature's caprice cast) of bright sunshine.

Mosses and daintiest ferns and flowers outspread,
Fill the deep hollows, while the trees o'erhead,
Willow and ash and lime, with honied blooms,
And plumy pine trees with their spic'd perfumes,
Brighten with light, where glancing sunbeams came,
Misty with shade, or dazzling bright with flame;
And yet so changeful, that capricious light,
That spots late dim with shade flash'd silver bright.

There's ever a calm beauty in the scene,
A radiance on slopes and uplands green,
A light that glorifies the lichen'd face
Of mossy boulders in each rugged space.
When thou dost walk by river or brook-streams,
With all their glooms, with all their changeful gleams,
With their glad prattle and their jocund play,
Swift glides the hours and lovely smiles the day.

Deep in these woods 'tis pleasant to recline,
Where beams of sultry noon thro' drooping forests shine;
There, 'neath a foliag'd beech or pine tree shade,
Or by some ash tree, sweet is refuge made.

Then shrilly sounds the locust's mid-day hum,
But silent all the katydids and beetle's drum;
Scarce heard the flitting gnat and buzzing fly,
Or wood dove's plaint, 'till sultry hours go by.

Deep in those groves 'tis pleasant to repose
When passing breeze with tremulous cadence blows,
Now swelling with a blast, like organ peal,
And now so soft they scarce on senses steal.
How fair those groves when starry spheres illume,
And flooding moonbeams dissipate the gloom;
Thro' densest shades their lances pierce the wood
And fill with radiance all the solitude.

Dear to the angler's heart those tufted groves,
Whose foliaged branches overhang the stream,
Some full-brimm'd river dashing on its way,
Now dim in shadow and now bright in gleam.
They greet, they beckon him with all their leaves,
They welcome him with silences and sound,
Their birds with liquid operas invite,
Their wild flowers all his wandering steps surround.

He seeks the woods that hem St. Lawrence Gulf,
And there, where rush the torrents to the deep,

He casts the luring fly with vigorous hand,
And takes the lordly salmon as they leap.
He seeks the depths of Adirondack wilds,
Where the primeval forests weave their shade,
And there his feather'd hook and pliant rod
Take springing trout from ripple and cascade.

Isaac McLellan.

The Thrush's Song.

Listen to the thrush's sadd'ning song
Deep in the forest glade,
Where perched within the shade,
He sings the whole day long;
Sweet, yet sad the notes he trills,
His dulcet harmony thrills.

Yet, though his notes are sad, he sings of love,
Of happiness profound;
With joy abound
The creatures of his house, the verdant grove.
In rivalry the happy songsters chirp and sing,
A minstrelsy of love and he is king.

We know him by his penetrating, pleasing song,
Sweet bird of silvery tongue,
With Nature's m-lody strung;
Attune with heavenly harp thy sweetest strains prolong.
Ah! during winter's grasp the grove is still;
Then vainly do we pause to hear thy gentle trill.

W. G.

A Heated Well.

A strange phenomenon is reported from the Indian Nation. Some time ago a white man named Chas. Gooding, living near Goodland, a station on the Frisco Road in the Choctaw Nation, employed an Irish well-digger, Mike Duhaney, to sink a well on his place. Duhaney began work and had reached a depth of sixty feet. At noon Saturday, after eating dinner, his assistants began lowering him back into the well to resume work, but he had hardly gone twenty feet when he screamed to them to pull him out quick, that he was burning up. As hurriedly as possible he was hoisted out, but on reaching the surface was unconscious and it required two hours' hard work to restore him. He was found in a pitiable condition, his clothing being scorched until it crumbled at the touch, and his body was fearfully blistered. The intense heat seemed to raise from the bottom, and a coat lying on the windlass, and the rope wound around it, were all charred until they broke into fragments at a touch. No flame could be seen. Simply an intense heat could be felt.

The denizens of the neighborhood are not only puzzled but badly scared, as they do not know what will next happen, their mildest idea being that a volcano slumbers beneath.

Speed of Wasps and Bees.

A writer in the *Scot's Observer* says that he has sprinkled individual wasps and bees with rose-colored powder, and has found that thus handicapped they could with ease keep up with the fastest trains when speeding down "Shap Summit," the steepest gradient in Scotland. Nor were these carried along in the rush of air caused by the train. They would come in and out of the window, sometimes disappearing for a minute or more, but frequently returning again and again. At distances of from five to ten miles they dropped behind, when others took their place.

The Land of Ducks.

There are more ducks in the Chinese Empire, says an authority, than in all the world outside of it. They are kept by the Celestials on every farm, on the private roads, on the public roads, on streets of cities and on all the lakes, ponds, rivers, streams and brooks in the country. Every Chinese boat also contains a batch of them. There are innumerable hatching establishments all through the Empire, many of which are said to turn out about 50,000 young ducks every year. Salted and smoked ducks and duck's eggs constitute two of the most common and important articles of diet in China.

Eternal Growth.

Even the things that seem to die,
But change their form, to spring again
In form more fair, in worth more high,
Through Nature's ceaseless travail pain;
As fecund seed to earth consigned
Decays, yet yields a hundred-fold,
As faggots burned still leave behind
Their substance, which no power can hold.
By herb-fed flesh our life is nursed,
But earth, herbs' food, was rock at first.
Thus Nature strains from high to higher,
And all things toward their source aspire.

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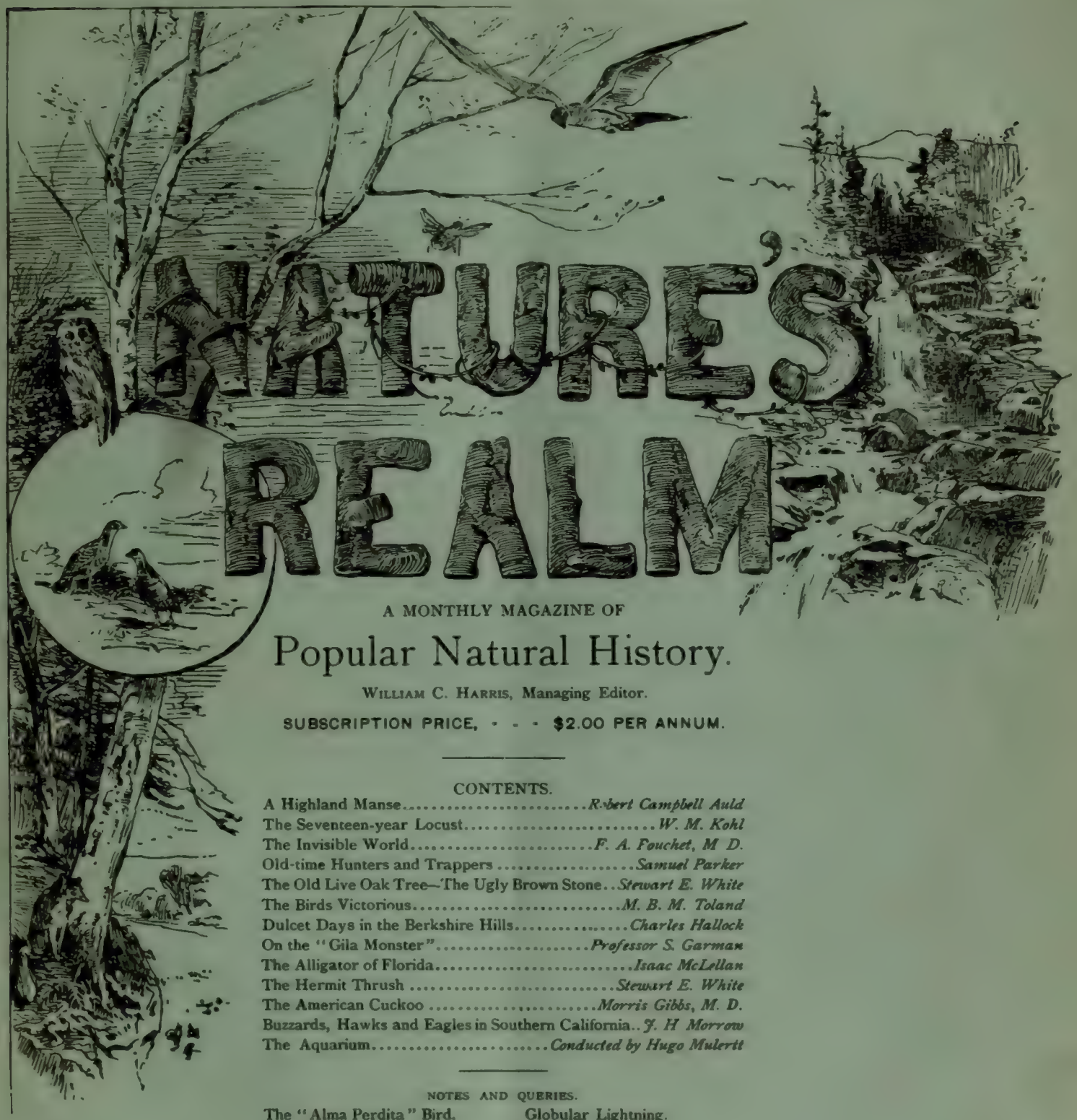
VOL. II., No. 3. MARCH 1891. PRICE 20 CENTS.

[Entered as second-class matter in the New York Post Office.



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Popular Natural History.

WILLIAM C. HARRIS, Managing Editor.

SUBSCRIPTION PRICE, - - - $2.00 PER ANNUM.

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PUBLISHED BY

THE HARRIS PUBLISHING CO.,

10 WARREN ST., NEW YORK.

J. KLINE EMMET, JR., Pres't. H. R HARRIS, Sec'y and Treas

NATURE'S REALM.

VOL. II. MARCH, 1891. NO. 3.

A HIGHLAND MANSE.

By Robert Campbell Auld.

There are days which occur at almost any season of the year, wherein Nature reaches its perfection; where the heavens and the earth produce harmony as if that Nature would indulge her offspring. * * * We bask in the shining hours, * * * where everything that has life gives signs of satisfaction; and the cattle that lie on the ground seem to have great and tranquil thoughts. * * * The day, immeasurably long, sleeps over the broad hills and warm, wide fields. The solitary places do not seem so lonely. To have lived through all its solitary hours seems longevity itself.—*From Emerson's essay on "Nature."*

The Manse of Glencomie is cosily and pleasantly situated on the brow of a hill that rises sheer from the Glen Burn. It is confined in its rear by some stretches of loamy fields. These, dignified by the name of "parks," were very irregularly shaped indeed, and, to the number of about half a dozen, constituted the "Glebe." Glebe lands are generally not the poorest in the parish. The Glencomie Manse lands were, as the country phrase went, "weel laid oot" and in "guid he'rt," for "the Doctor, ye ken, was a gran' fairmer." The arrangement, too, of these parks was very peculiar, but this only added to the picturesque quaintness of the other surroundings. They swept here, curved there and disappeared everywhere. Each was enclosed by a rank, sedgy ditch, banked by a "sunk" mossy dyke, beyond which the view was skirted by a luxury of solemn fir, gaudy rowan, gray ash and gay birch. In front, down there along the foot of the lawn, which was the edge of the steep of the burn, was a line of noble sauch-willows of over fifty years' growth. These had been planted there the same year as the "placing o' the present meenister." They bent their great gaunt limbs and their gracefully topped forms to the southwestern breeze with curious ease. Deeper down still were a thick round-headed clump of alders with their funny dependent plume-like inflorescences. These thick heads hid and hedged in the burn. This was the limpid, liquid, running, glistening and restless occupant of a lovely rocky channel; a rift in nature, making a lucky romantic dell for boyish and girlish pranks. Air and light penetrated this sufficiently from the other side and encouraged all sorts of fantastic growth to hold in its embrace the regardless little stream. Bare, sheer-faced surfaces, sharp jutting edges, steps of grassy ledges, dark-nooked recesses, carpets of green-hued softness, hemmed or stemmed the tide. And where the channel widened the dark water spread itself thinly, clearly, over a gravelly, shingly bed. Everywhere there was a rank growth. Such growth! Summer glory of transparent delicate green, filmy, feathery fern, rush and reed; mossy, dripping, glassy-surfaced, pebbly mixture. Here a spark of floral red, there a bunch of blue or golden yellow; all enhancing the ethereal charm. Through all this maze and myth fled in careless awe the "silvery streak," or deep, dark burn, with its mysterious lullaby in this strange, early summer hour. Through all this it gaily purled and swirled, plunged and plashed, gurgled and babbled, struggled and stumbled; o'er easy shingle, into deep, dark pot, o'er rocky bar or ambitious fall; hiding in many a cranny, confined in narrowing bounds, or wandering o'er sudden widening shallow; flowing, ever changing, never ending, the silver dashed with a frothy, bronzy bree. The water

was really a dark bubbling brew sucked from many a peaty ooze away up in the moor; silver sheened and iron-bronzed.

And what a trouting one got there! How it charmed Master Dolphy and his particular friends! Strangers at Manse breakfasts were astounded at the rich colored fish, so plump and well flavored. They were caught at early dawn by Master Dolphy. This was indeed the only enticement that was ever known to draw this young gentleman from his sluggish couch sooner than the last breakfast bell, when he had to make a hurried, slovenly rush to get to his place before the anticipatory grace of the painfully precise "Doctor." "Ah!" laughed Master Dolphy in these years of precocious volubility, as the tempting, steaming, delicate fish were served around to the eager guests, "Ah! they are the real Glencomie speckle-backs." The burn, though, hastens on, wending its fretful way down to the Peel of the Auch, thence to the Auch Loch itself, another fishy-finned, as well as feathery-winged, resort.

Ah! this burn was a fairy-peopled haunt. Long have we lingered amid its charms, absorbed in its varied aspects of golden dappling and variegating sunshine, or the silvery glinting, and thus so often scary, eerie moon-night light.

The Manse itself was, by an indefinable something about it, at once seen to be "aboove th' ordinar'," though it was a bare-walled, straggling structure. Its many wings spread out puzzlingly awry. There was nothing about its gray white extent of cold, hard, harled walls to relieve their unplacid monotony, except at one awkward ga'le, a few streaks of young, hard-skinned ivy spreading out like opened fingers. These leaf-gripping cords seemed to make a desperate claim for support and pity. The Manse was about three times the size of any apparent necessity. The pile had been successively, wing by wing, added to at evidently very different times to accommodate the difficulties of parochial heritors' tightness. Its outward morphology therefore gave the idea of a rather complicated internal arrangement of chambers and passages, queer-shaped rooms and crooked alleys, floors of annoyingly varying level, with narrow, winding and steep stairs. "Ah!' but of course would exclaim Master Dolphy, "what hide and seek pranks we can play"—to the most amusingly suppressed exasperation of the terribly serene and dignifiedly long-suffering Doctor. But the merest glance from the outside in at the windows discovered the key to the sort of life that was led within. The clear, transparent brightness of the window panes, with just a little bit of old-fashioned, richly carved oak furniture forcing itself into view against the heavy edge of the thick, mossy curtain from behind which it peeped so slyly, just over a dainty little stand, too, that always bore some gay-colored hyacinth or less effusive geranium. A bar of bright red higher up indicated an old-fashioned window blind. Heavily draped and well preserved in color, thickly surfaced, richly patterned, too, and subduedly tinted, hung the curtains which fringed the sides of the bright windows. All this hinted at some more delicate charm other than that the sole undomestic sterner sex could produce within. Ah! so! Yes, there was Tibbie, who reigned as queen-mistress and "housekeeper" (what a dear name to some thoughtful girls!) since that sore night that had taken the former Manse mother so mysteriously away from her. Tibbie proved a rare blessing to her father, and indeed to everybody within and without the Manse and far around.

The serene composure that had ruled within the Manse had perhaps been influenced by the close contiguity of the churchyard with its frequent solemn remindings. The door of the Manse faced the little private gate entrance to the God's-acre. From the peculiar conformation of the ground the surface of the latter was on a much higher level than the Manse itself. The "kirk-yaird" was thus reached through the "yett" by ascending some narrow, age-worn stone steps imbedded in the mossy-patched, grassy-tufted, lichen-plastered side walls that were continued around and confined the "yaird." The steps were worn and rain washed; the little iron gate was rusty and hung heavily, almost helplessly, on one apparently creaking hinge. There was a sacred reluctance to interfere with the influence of unrepairing time. The "Aul' Kirk," standing

away in a corner, was a great, gaunt, plain, square "biggin'," with a high pitched roof and narrow peaked windows and confined doors. The walls were of granite, rough dressed except at their corners or edges. The roughening edge of time had here also smoothed down the sharp brand-newness of masons' delight. The gables were high pitched, and at each end were the entrances to the sacred house. The doors were half folding, of oaken strength, skinned and wasped all over their grained surfaces. The steep roof presented no break in its monotony except at the end further from the Manse, the west end. Here was the only, if it could be so called, architectural feature of the rigidly plain and simple Gothic pile. This was the high stilted belfry. And in that even the bell hung half turned over.

Withal the kirk-yaird had, to sensitive youth, an eerie enough and awesome enough appearance. The kirk-yaird was like many others, little touched by human hands, so long, apparently, that no too ghastly growth, too rank or weedy, made itself over conspicuous or too obtrusive to view from beyond. Away with the trimness, the primness, the shorn forlorness of straight-edged path and grass plot, as is entailed on modern "city cemeteries!" Who loves such? Who can lie there comfortably after having once delivered himself to Mother Earth? Give me the centuries-old resting place of the lonely Highland glen; give me its mossy-grown walls, its rutted rones, its green damp stones that are rude, rough hewn and well nigh disappearing out of sight, and undecipherable. Let no prim, ephemeral artifice disturb the wild beauty growth above and around our dust. Let pure nature, without any of its rankness or grossness, spread its own thick veil over our head. If it will, let the grass move our headstone, and let the moss obliterate the letters telling our unadorned baptismal name. Here where we linger would be a pleasant resting place. Here the stones are in all half-buried positions or sunk near out of sight. The older ones, some of them, have strange devices and legends if we could take patience to trace them out. Skull and cross bones, armorial bearings, all yielding to gradually obscuring obliteration—crumbling down material for plant growth. How gaunt and grotesque they are, as if they had been placed there as stolid sentinels till doomsday. Everything is as still, too, as the death emblems around. And it is a high summer's noonday.

As still as death! Or is it that we have been so abstractedly absorbed? Yes! surely; for gradually we have seemed to get into some nearer communion with that very Nature. Nature? Ah! yes. That is always busy, even in death. Listen! The air above, and even amongst the vegetation at our feet, seems waging ever one unweary battle, struggling for its own being. The hum of the insect, the flit of its wing, all is busy hurry-skurry. The sudden moment's glitter of a beaded thread evidences the cunning life of many a silent yet busy living thing. The high-strung, tremulous murmur that rustles among the leaves and blades becomes more knowable. Could we but see even a little, but a very little, closer into the teeming leaves and blades; could we see these adding on cell to cell, and width and height to their growing sides and lengthening tips! Now, raising the vision just above the ground, is seen that warm, glowing, airy wave; life's medium creeping above earth as high as the serenity of the pure azure lift.

All seems so perfect in sympathy, and still yet so strange, as if there was a stealing away to some realler sphere of more certain peace, away from worldly strifes and strivings, all the while dimming one's sense of presentness and filling one instead with a full and fuller dread feeling of immediate presentiment. Worldly strife! Oh! what a double meaning a cunning vocabulary can give!

This day and this hour; how long has it not been remembered, and so well? Sitting silently and so sadly on a hoary headstone of a lineal ancestor, long, so long, dust; filled with the strangeness of the nearness to the unseen, yet never attaining any nearer satisfaction; seizing, as it were, on the untangible; drawn away from earth while yearning but the more to it. What is it? We feel spirited. That some being, that we will never have the power to realize, call it what we will, is around us; that it has stepped forth and filled the void. It seems as if our own inward being goes forth and would

yield to the communion. But no; it is not possible. A revulsion occurs; our head sinks into our hands again; our hands fall down. What a flood of burning light is in our eyes, screened sun-glow! The whole living soul seems to die out of its home; all is dazed—dead. No! Hush! is that the voice that was sought? Through the dazed sense it comes so softly, purely sweet, from there on high—sacred height—a trembling, muffled, throttled warble, fluttering through the welkin, so suddenly, sadly sweet. Surely it is from some heart-broke voice. Was it watching the sorrow of some one below on earth and greeting out its sympathy? Ah! thou sweetest warbler of the bright summer sky time; thou hast brought us back to ourselves again. We raise our face to the blinding blood and gold of the high sun sheen, blinded in a sheet of red and gold. Yes; involuntarily we stretch out our head and hands. We hang on the notes, gladly enthralled. We can count the song's periods. It must, in spite of any potent wish—it has to cease. There; there now, for it has reached its pyre. What a spell—a sort of terror seizing you! It has blankly stopped after we have watched its fluttering, high ascension. The summer sun lark falls dead-like, with one soft, willy-willy wail, to its groundling nest. And what terrible thing is next to happen? The lark sank sudden with that one weary, weird wail. We would, too, die away into a welcome oblivion, but we are as transfixed. The lost notes still seem to come, still caught, and ringing in the ear more mellow from the expired distance. So do reminiscences play tricks with us. With what a sudden, short shock—pang—does even that die away too!

Spell-bound still. What a feeling and what a power to be enthralled by a sense lighter than air, yet how much more binding. Isn't presentiment but fulfilling? There is a quickening of the pulse and of the spell, for we now suddenly start and instantaneously realize what it is, though no sound or sight has yet impressed our sense. As one can by a memory sense reproduce past images or tones, can our presentiment instinctively materialize in the eye and in the ear that which is caught just on the verge of the happening? Can we get before the event? Such seemed to be the case now. Oh! that it would now in actuality quickly break this horrible, grinding, grating spell, that makes us now to shiver and shudder. Ha! there it comes, and we stick our fingers in our ears to dull the crazing edge of it.

How it shivers into us! Listen, if you can. 'Tis a creak, creak, cracking knell, a chirp, chirp, chirping *knell, knell, knell.* Oh! harshest, rusty bar of rusty, creaking bell. Oh! thou, too, rheumatic belfry bell. *Knell, knell, knell.* So it continues to its crusty, clanging, creaking chirrup. And we are so close to it. But, as we rise, we see no one; just hear that eternal, rasping *knell.* Is it determined to condemn us to an eternal horror? All we see is the rusty iron, whipping, lashing to and fro against the unseen ga'le. Whip, creak, clang and *knell.* Will it never cease? *Knell, knell, knell.* Now at last we have caught up with the number of the strokes. Four, five, six; *knell, knell, knell.* We stand aching as we listen, thoroughly aroused, awakened, and now solemnly conscious of the about to happen; aroused at last out of the mysterious life dream to the sense of the more mysterious death dream being slept by one now being borne toward the last resting place. And yet the flesh creeps, and that to the rusty, creaking antagonism of the death-telling and age-recording bell. *Knell, knell, knell.* We count on to *nineteen, twen*—no! no more. It stops there, but there is yet the dying *'ell, 'ell, 'ell.* It dies away slowly in circles of sound like the little mourning warbler's—sad sounds of sympathy. And still the dying sounds rise like billows and fall, and calm down to at last imperceptible ripples, that live and linger only in the sensitive, retentive ear. The irony and the force of that bell! It has once more told life's story, and tolled the last sad echo. It is clay to mould; yet so young, and in this glorious, glinting summer day! So life is told.

THE SEVENTEEN-YEAR LOCUST.

By W. M. Kohl.

The Cicada—*Septendecim*, Linnæs; *Tettcyonia septendecim*, Fabricious.

This is an insect which has—in Pennsylvania at least—obtained the general appellation of locust. It presents a life of evolution, beginning in the earth, ascending to the tree, and returning its life to the roots again, to await its allotted time to reappear.

In the village of Jenkintown, near Philadelphia, Pa., in the early part of April, 1885, while skimming off a few inches of dirt from a carriage drive, I uncovered holes honey-combed in the earth, half an inch in diameter and perfectly symmetrical. They were mostly under old trees, where they had approached very near the surface. We uncovered the chrysalis about six inches below the surface, and awaited the proper time and condition of weather for them to come out. In the latter part of April they made their appearanee. If rainy or muddy weather intervenes they cement the mouths of their holes with mud, to keep out the water until favorable weather.

They encountered many difficulties, coming up under stones and brick pavements, making their way out often through the cracks. I have a piece of iron plate, many times the weight of a locust, lifted up and propped by mud at an angle to let the insect out. The majority of holes were under trees or where trees had been.

Naturalists say they come out only in the night. For almost two weeks I watched them nightly, and they made their appearance an hour before sundown, increasing in numbers until dark. Crawling by thousands through the grass and over the bare ground in their brown casing, which they are about to throw off, they are often covered with mud. Ascending weeds, posts, fences and frame work in droves, and particularly trees, they fix themselves to the bark and on the leaves. At this time they encounter many enemies, as chickens, hogs, squirrels and birds are very fond of them. Our cat was seen every evening watching in the grass, seeming to relish them as a dainty. As grubs (fig. 1) they have a cylindrical proboscis; anterior coxæ, thick and strong, toothed beneath, fitted for digging; abdomen in eight segments; six feet, and are different from the larvæ in having the rudimentary wings.

One evening I secured seven on one branch,

Fig. 1.

and witnessed the operation of their new birth by lamp light. They were some time running up and down selecting a position. Once fairly

Fig. 2.

fixed the back part of the head soon becomes smooth and glossy, as if stretched to its utmost tension. In five minutes from the time of settling in position, a longitudinal fissure, showing

a thread-like white line where the split occurs, on the back of the head first, extending finally from the first joint, connecting the proboscis or forceps to the body joint, half an inch in length. In three minutes more the head had pressed its way out. Gradually the forelegs were withdrawn from their sockets, say in one minute. Then the whole body swung slowly backward, head down and feet outward, suspended (fig. 2) with an occasional tremor, as if trying to extricate the hind part and legs. When it had hung for three minutes it then very slowly, like an acrobat, brought its body up to the original position, withdrew the hind legs and body, and in two minutes more stood outside the puba skin in full form, an inch long, of a white, waxy

FIG. 3.

appearance, with red eyes like rubies. The wings showed only as a mass of cramped-up white film. In a minute the wings had grown to three-quarters of an inch, by measurement; in three minutes to one inch, and in six and a half minutes to the full size of one and a quarter inches in length and half an inch in breadth. In twenty-two minutes the whole process was accomplished.

The next morning I found them scattered around the room, on the windows, ceiling and tops of the doors, and their body was dark, finely variegated, transparent wings, and the letter W well defined in the veins of the wings. The rings of the body were edged with dull orange, and legs same color.

After the locust has attained its perfect state (figs. 3 and 4 showing it in flight and repose) they spread out into orchards and forest trees, making the woods resound with a sound resembling the pronunciation of Pharoah. The organs of music are internal, placed at the base of the abdomen beneath and covered by two large plates, as seen in fig. 5. The sound issues out of the two holes beneath these plates. To the inside of these kettle drums are fastened cords that voluntarily contract and expand with great rapidity.

Naturalists have spoken of locusts as doing great damage by eating up all green and tender plants. This cannot be the seventeen-year locust, though so stated in "Animal and Insect Biography" and other works. Nothing of the kind came under my notice in a very careful study of their habits during their visits in 1834, '51, '68 and '85. They appear at different times

FIG. 4.

in different sections. In 1834 I was quite young, but my memory became quickened by having a little garden, about eight feet square of space, assigned me by my uncle in one corner of the big one, and I was astonished to find the largest part of my crop that came up was locusts, completely riddling the ground. That year the grain was borne to the earth by them. I did see, however, in one year in Kansas, the fields, gardens, corn, and even large-sized nursery trees, stripped of the bark clean to the white wood, every vestige of green gone, and the ground entirely bare. This was done by the Rocky Mountain locust, shaped like a grasshopper. We could not walk in the halls and rooms of hotels without crushing them under foot. When in flight about a mile high they were so thick as to darken the sun, their wings glistening with silver reflections.

The female locust is called by the male with

a chirping noise. Soon after pairing, about the end of May, they begin to lay their eggs, an operation I watched the female perform. She selects the tender twigs of trees like the chestnut, about a foot from the end (fig. 6). Taking firm hold of the twig, she thrusts out a black dart from the tail. This dart is an apparatus provided in the female for slitting the

Fig. 5.

Fig. 7.

Fig. 8.

branches and depositing her eggs, and consists of several pieces fitted together (fig. 7). The dart proper is composed of two pieces (fig. 8) placed right and left, spear-shaped, and working something like a saw. The side pieces (fig. 7) convey the eggs to the nest. This dart is thrust out about half an inch, and pierces the limb obliquely in the direction of the fibre to the pith of the branch (that the larvæ may live upon it when in its tender state), splintering the wood in small fibres. Slitting the bark a quarter of an inch forward, the dart again pierces deep, and so continues in four places (fig. 6), each time plowing back and conveying the eggs to their place by means of the grooved side pieces of the piercer. The eggs lay in straight layers along the same branch. The slots are from half to an inch long, in each of which they deposit from four to ten eggs. It is said one female will deposit from 400 to 700 eggs, going from one branch to another. Soon after depositing their eggs they die and fall to the ground. In riding along Edge Hill road, through a forest of chestnut, I found them so numerous as to be constantly flying against us, the dead lying thick upon the ground.

The ends of the branches from the place of depositing the eggs die, break and hang down, in some cases covering the outer surface of the trees with dead branches and leaves, in singular contrast with the inner green foliage. T. W. Harris says:

Fig. 6.

"They severed the branch below the eggs, so that the wind would twist off the extreme part containing the eggs and let it fall to the ground."

Also Westwood in his works remarks:

"They make choice of dead dried branches,

being apparently aware that moisture would injure her progeny."

Both writers have certainly erred, at least so far as this locality is concerned, and I fear they write, like many do, without personal observation, for I find the branches die from the sting, and, developing at the proper time, the young drop to the ground.

Fig. 9.

About two weeks after the eggs had been deposited I cut off some branches and found, after laying them open (Fig. 9), the larvæ in layers of eight to fifteen each, one-twelfth of an inch in length and one-sixteenth in diameter, lapping over each other something like a length of bricks stood on end and toppled. They were pearly white and the shape of a cigar. Soon they drop to the ground, in appearance, shape and color of the parents when first coming to the air, and burrow their way down from two to twelve feet, living upon the roots of trees and weeds until their allotted time to arise from the ground.

When young, half a century ago, I did not hesitate to catch them in my hands, and never heard of any one being stung. Strange to say, of late years everybody is afraid, there being well attested cases resulting fatally. May not these results arise from the female, which at the moment of striking deposits her eggs in the human flesh. I have, I believe, a sure cure, which I have practically tried, and will give it in a separate article.

THE INVISIBLE WORLD.

By F. A. Pouchet, M. D., Author of "The Universe."

Our imagination, says Bonnet, one of the most zealous expounders of natural history, is equally confounded by what is infinitely great or infinitely small.

In fact, the phenomena of creation astound us, whether, uplifting our look, we scrutinize the mechanism of the heavens, or cast our eyes upon the tiniest creatures of this lower realm.

Immensity is everywhere. It stands revealed in the azure dome of heaven, where glows a perfect dust of stars, and in the living atom which hides from us the marvels of its organization.

"Whoever," says an illustrious author, "contemplates this spectacle with the eye of imagination, feels the littleness of man compared to the greatness of the universe." But although it is true that in presence of the immensity of space and the eternal duration of time a feeling of humility subjugates us; although each step that man takes in his path, and every wrinkle that furrows his brow, reveal his utter feebleness; yet his genius, that divine emanation, supports him on his journey by showing him both his power and his lofty origin.

When, at the very outset of our studies, we cast a glance upon creation, we are astonished at its vastness, and we see that none of our fictions attains the sublimity of its proportions.

For instance, the Chinese accounts of creation represent the first organizer of chaos under the form of a feeble old man, enervated and tottering, called Pan-Kou-Ché, surrounded by confused masses of rock, and holding a chisel in one hand and a hammer in the other. He toils painfully at his work, and, covered with perspiration, carves out the crust of the globe, at the same time that he clears a path through a wilderness of rocky masses.

One shudders at the relative feebleness of the workman to the immensity of the task. Well nigh lost amidst enormous masses of shattered stone, which surround him on every side and encumber the picture, he is scarcely seen—a real pigmy executing a herculean task.

On the other hand, the people of the North, looking upon their land so often devastated by floods, thought that some god in his terrible anger had broken up the surface of it, and gathered the debris into heaps. To the children of Scandinavia this diety was not a palsied and infirm old man; they required a divinity endowed with their own savage energy. In their eyes it was the god of tempests; the redoubtable and gigantic Thor, who, armed with a blacksmith's hammer, and suspended over the abyss, with mighty blows broke up the crust of the earth, and fashioned the rocks and mountains with splinters. Here we see already an advance upon the feeble old Pan-Kou-Ché; manly vigor is substituted for the impotence of old age. It is a reminiscence of the ancient epic poesy. Thor shows like a revolted giant, raging and shattering everything that falls within his reach.

But to us, accustomed to bow before an all-powerful Creator, such images appear very puerile. Instead of these old men and giants laboriously occupied in hammering out the globe, we only trace everywhere the invisible hand of God. In one place, with a delicacy which passes all conception, it animates the insect with the breath of life; in another, expanding itself to vast dimensions, it reins the worlds scattered through space, convulses or annihilates them. It is at such times that, in the midst of its throes, our globe cleaves its mountains and opens up its abysses; and upon each of its gigantic ruins, as upon each grain of sand, the philosopher finds written a grand page of natural theology.

In fact, every crumbling peak displays to our view the remains of generations buried by the revolutions of the globe. Their numbers, their size, their unknown forms astonish us; but we cannot doubt, for these inanimate remains, of which the earth has faithfully kept the impress, are so many medallions struck by the Creator and spared by the hand of time, to reveal to us the world's eventful history.

If we review the living forces of our planet, we soon perceive that their power is boundless. When they are unleashed within its bowels, the whole face of the earth is shaken. At one time they raise up the Alps and Himalayas, their summits towering into the region of the clouds. At another, almost cleaving the globe

from pole to pole, the Andes and America rise from the bosom of the sea; then the startled waves, tumultuously pouring over the ancient world, produce one of the more recent catastrophes, the great deluge. Thus the supreme Power decreed!

When, after having viewed the imposing phenomena which are taking place on the surface of the earth, we look down upon its tiniest inhabitants, we see revealed, in unexpected magnificence, all the wisdom of Providence; ere long the spectacle of immensity in what is infinitely little, astonishes us no less than the immeasurable power displayed in the grand scenes of creation. Animated nature seems to imitate the ancient pantheism, which distributed portions of the divinity to every molecule of created matter; she equally reveals herself everywhere: armed with the microscope the eye discovers her traces in every interstice of matter.

Fontenelle was wont to censure the ancient verbose scholasticism, which he rightly called the philosophy of words. The learned secretary of the academy wanted to see the intellect occupied solely with facts—with the philosophy of things. We are about to prove ourselves followers of his precepts by restricting ourselves to the results of observation.

PAN-KOU-CHÉ, THE CREATOR.—FROM A PAINTING IN A CHINESE MANUSCRIPT.

Nothing gives a more brilliant idea of the

universal diffusion of life throughout space, than the prodigious number of organisms which we meet everywhere and in all bodies. The demonstration of this fact is one of the most recent and magnificent conquests achieved by science.

We owe it to the microscope, discovered about a century and a half ago. This instrument at once displayed to men objects so new, striking, and unexpected, that it was everywhere admitted to have opened up a new world, by conferring, as it were, upon us an additional sense wherewith to investigate the invisible.

When we read the works of naturalists, and see them penetrating so deeply into the most hidden secrets of the anatomy and manners of beings, the mere existence of which the eye could not lead us to suspect, we are apt to ask if the pride of genius has not usurped the place due to the simple realities of nature; and hence, for a long time, the statements of microscopists were, by some obstructive minds, rated as fables. But when we see their instruments, constructed with such great precision, we at once conclude that, however marvellous their investigations appear, still they did not deceive themselves.

THOR, THE NEPTUNE AND CREATOR OF THE SCANDINAVIANS, RECONSTRUCTING THE GLOBE.

OLD-TIME HUNTERS AND TRAPPERS.

By Samuel Parker.

Aside from the Indians few characters have figured more conspicuously in the drama of the new world than the old-time class of hunters and trappers, at the head of which stood Kit Carson and Daniel Boone. An interest thrilling and extraordinary attached to these hardy rovers of the wilderness, whose nightly couch was the bosom of Mother Earth, and about whose picturesque and smoke-tanned costumes there clung the permeating odor of pine and cedar boughs.

From the serene mountain solitudes of the far Northwest, where Nature has dipped her pencil in the rainbow and transferred its gorgeous dyes to the walls of the grand cañon of the Yellowstone, and along the banks of every river that traverses the vast rolling plains beyond the Missouri to the rivers of the ancient Montezumas in Mexico, the smoke of their campfires has curled upward through the crisp desert air unseen of human eyes, save those of the painted Indians, by whom these fearless adventurers were regarded as invaders of the red men's possessions, and who were ever eager to adorn their lodge poles with trappers' scalps.

The glamor of romance which imaginative literature has thrown about the eventful lives of the hunters and trappers of olden times, is perhaps no more extravagant than the actual experiences which they encountered amid the solitudes of the untamed wilderness. What boy has perused the thrilling adventures and hair-breadth escapes of the hunters and trappers in the palmy days of the Northwestern and Hudson's Bay fur companies without a feeling of the most unbounded enthusiasm, along with a corresponding tinge of regret that he was born too late to cast his lot with those long-haired and buckskin-clad adventurers, to whom the perils incident to their wild vocation were more congenial than the tamer pursuits of civilization? However this may be, it is certain that the secret charm of the romantic delineations of hunting and trapping episodes consists largely in the picturesque and scenic grandeur of the localities wherein the same are laid, and it is likewise true that nothing could appeal so powerfully to the imagination of a susceptible boy and gradually inspire him with an ardent love of the beautiful in nature as the stories of the old-time fur hunters. It matters little whether the storied exploits of Antelope Tom or Beaver Pete be depicted on the canvas of fact or fancy, the background of the picture is usually a rushing, pine-belted river, an imposing forest or a range of cedared mountains with their hoary summits sleeping among the clouds. Nor is the boy alone in his admiration of the allurements of a primitive life such as characterized the hunters and trappers of early days. Men of wealth and culture, who have been reared amid the luxuries and comforts of a pampered civilization, and who, in response to the nomadic impulses of their natures, have betaken themselves for a brief season of camp life to the mountains and prairies of the far West, have returned regretfully to dream of crags and eagles, tumbling waters and wind-stirred pines.

Perhaps, however, the most remarkable instance in support of the singular fascination of the life of a mountain trapper, barring, of course, the nationality of the individual, is that of the educated Indian trapper of which mention is made in a history of "The Great West" published some forty years ago. This Indian, according to the account of a traveler, by whom he was discovered in the region of the Rocky Mountains, was a graduate of Dartmouth College, New Hampshire, a profound and elegant scholar and a critic on English and Roman literature, but who for seventeen years had been pursuing the avocation of a trapper. His reply to the gentleman's query as to why a man of his scholastic attainments had chosen to cast his lot in the wilderness, while strictly characteristic of an Indian, was likewise tinged with the enthusiasm engendered by his long familiarity with the wild sublimities of nature.

"Red men," he remarked, "often acquire and love the sciences, but with the nature the

Great Spirit has given them what are all their truths to them? Would an Indian ever measure the height of a mountain that he could climb? No, never! The legends of his tribe tell him nothing about quadrants and base-lines and angles. Their old braves, however, have for ages watched from the cliffs the green life in the spring and the yellow death in the autumn of their holy forests. Why should he ever calculate an eclipse? He always knew such occurrences to be the doings of the Great Spirit. Science, it is true, can tell the times and seasons of their coming, but the Indian, when they do occur, looks through Nature without the aid of science, up to its cause. Of what use is a Lunar to him? His swift canoe has the green-embowered shores and well-known headlands to guide his course. In fine, what are the arts of peace, of war, of agriculture, or anything civilized, to him? His nature and its elements, like the pine which shadows his wigwam, are too mighty, too grand, of too strong a fibre, to form a stock on which to ingraft the rose and the violet of polished life. No! I must range the hills; I must always be able to out-travel my horse; I must always be able to strip my own wardrobe from the backs of the deer and buffalo, and to feed upon their rich loins; I must always be able to punish my enemy with my own hand, or I am no longer an Indian. And if I am anything else I am a mere imitation, an ape."

The first trappers to penetrate the great hunting grounds beyond the Missouri River were the French, and the ease with which they conformed to Indian customs tended in no small degree to mitigate the perils and privations of the wilderness. Scarcely a region that is breathed upon by the western winds but what has been visited by these adventure-loving characters, and a great proportion of the mountains, lakes and rivers still retain the pleasing and poetic names bestowed upon them in their rude geography.

Along with a variety of rough accomplishments, such as the skillful propelling of a frail birch bark canoe over the treacherous rapids of some rock-vexed river, the unerring directness of their course on their overland journeys, and their expertness in outwitting and capturing the sagacious beaver in its haunts, these nomadic dandies of the wilderness were gifted with a proficiency in the art of love making sufficiently remarkable to have excited the envy of the most successful cavaliers that ever thrummed a guitar in the gardens of Andalusia; and many a dusky, passionate-eyed maiden of the forest, charmed by the polite and winning blandishments of the roaming trappers, or dazzled by the glittering display of beads, colored cloths and other Indian finery in the canoes of the picturesque "Coreurs des Bois," have given their hands and hearts in marriage to their bold and volatile admirers. A liberal sprinkling of descendents, the result of these intermarriages, may be found among the various tribes of western Indians, particularly the Sioux. The half-breeds are characterized by a gay and careless disposition, with a fondness for boisterous amusements, dancing and horse racing, the proverbial stoicism of their Indian ancestors being conspicuously absent. The early Government exploring parties usually employed the Erench *voyageurs* and trappers as guides, scouts and interpreters, their knowledge of the country and their fluency in both the English and Indian tongues rendering their services indispensable.

A prominent specimen of this class is Basil Clement, an old ex-guide, scout and interpreter, hunter and trapper, at present residing in an old-fashioned double log cabin on the upper Missouri River in Dakota. Clement's wife is a half-breed Sioux, a descendent from the famous Lewis & Clarke expedition, which years ago explored the country in the vicinity of the Yellowstone. The knowledge of the geographical features of the interior wilderness beyond the Missouri which old Basil possesses amounts to an instinct, and has ever placed him in the foremost rank as a guide and scout in military expeditions.

One night in the winter of '81 Clement was one of a party of passengers returning on the stage from Deadwood to Fort Pierri. The conversation chancing to turn on Clement's great reputation as a guide, the passengers, simply through an idle curiosity, decided to put him to the test. Accordingly during the night, whenever a halt was made at the differ-

ent watering places, etc., along the route, some passenger would call out: "Where are we now, Basil?" And Basil, who, by the way, had been enjoying a rather extensive bout with Bacchus while in Deadwood, was dozing in the corner of the stage, would start suddenly up, pull aside the leather curtain, and, thrusting out his head, take a sweeping glance at the dark landscape without and name the locality forthwith. And the driver, whose confidence in Clement's ability was unlimited, would triumphantly respond: "You're mighty right, Basil; that's jest whar we be."

Although well-to-do in the world, being the owner of fine pony herds and also considerably advanced in years, yet with each succeeding autumn Clement rarely fails to load a pack animal with blankets and traps and mounting his favorite riding pony depart for a few weeks' trapping amid the haunts frequented so often in his younger days, returning usually with a fine pack of furs and a fresh budget of adventures. Clement is the very essence of the hospitality so characteristic of the frontier, and the wayfarer who may chance to pass a night in his tidy, well-kept cabin will be entertained with a bundle of truthful and exciting reminiscences, delivered with a series of vehement gesticulations and a rattling volubility that is simply amazing. After a healthy pull at the wayfarer's flask of the antidote for the bites of rattlers, old Basil will proceed to regale him with an account of the time that he was chased by gray wolves on the Powder River, and of a certain night on the Belle Fourche when a prowling wildcat attempted to appropriate a fine parcel of beaver tails which were being held in reserve for soup, and how his own attempt to pulverize the midnight marauder with a club resulted in his buckskin pantaloons being reduced to shoe strings. The interest of these recitals is greatly heightened by the variety of gymnastic evolutions in which old Basil invariably indulges during their rehearsal. Chairs and other portable objects within the cabin are converted for the time being into imaginary wolves and wildcats, and are accordingly subjected to the same quota of violent kicks and cuffs combined with a shower of maledictions identical to those administered to his genuine adversaries.

In respect to the sagacity of wild animals whose habits he has had abundant opportunities to observe, Clement yields the palm to the beaver, the instinctive cunning of which he strenuously insists falls little short of human intelligence. Sometimes, he declares, a mischief-loving beaver will, during the night, spring a trap with a stick apparently for the mere purpose of tantalizing its would-be captor.

Basil's admiration for the sagacity of the beaver, however, is exceeded only by his profound contempt for the sneaking coyote. Any brute, he maintains, that can make a comfortable lunch off a saddle-flap or a rawhide lariat is unworthy of the ammunition required to destroy it.

Although Basil makes no claim to ever having attacked a grizzly bear single-handed, yet in camping with the Sioux he has frequently assisted in dispatching these formidable terrors. Moreover, he corroborates the statement that the Indians during a protracted encounter with a grizzly and while taking an occasional breathing spell when the final issue of the struggle is already decided in their favor, will address the bear as if it were a rational creature, upbraiding it for its temerity and lack of judgment in daring to stand fight against foes so superior to him in power; knowing as he must, that the result could be nothing but his certain defeat.

Clement's home is located near the mouth of the Cheyenne, the favorite river of the Sioux and to which they have given the name of Wak-paush-te, or good river. With his beaver cap, his fringed leggings and moccasins which comprise his usual costume in winter, he presents the appearance of a typical specimen of the old-time class of hunters and trappers who have long since preceded him to the Happy Hunting Grounds of Eternity.

THE OLD LIVE OAK TREE—THE UGLY BROWN STONE.

By Stewart E. White.

Alone in the midst of the flower-starred mesa stood an old live oak tree. All around the flowers whispered to each other of his grandeur; the little birds carolled their tiny songs and built their fairy homes among his leaves; his lullaby was softly sung by the hermit thrush and by the wind gently sighing through his branches; his reveille was sounded by the ceaseless beating of the Pacific Ocean and by the clarion whistle of the quail. Soft-eyed cattle stood beneath his grateful shade, and men came from far around to gaze at his fair proportions and to add to his homage. The old live oak tree was very happy, but a little vain withal.

Soon the poppies, nodding their gorgeous heads, whispered to each other, and the birds ceased their busy search for food long enough to wonder at the new ornaments their old friend was acquiring, for from each of the lower branches hung long trailing veils of Spanish moss. They twined themselves around his mighty limbs and sung him songs of the Alhambra, and of the vine, and of the far-off, twinkling stars. They told him stories of the dewy-eyed señoritas of the South and the fair warriors of the North in their white-winged ships. The old tree was secretly delighted and encouraged the newcomers, for their graceful lines were becoming, and added greatly to his beauty, and their flattering tongues were sweet to his ears.

Little by little the moss embraced more and more of the arms of the giant, until from every twig long pendants hung. Never had the old tree looked so well; the light green moss swayed with every breeze, while his own dark green foliage rustled its approval. The sun shone as brightly as before, the flowers whispered still, men admired, but the old tree felt a growing discontent, for the birds had ceased building their homes with him, the herds had deserted him, and a strange stiffness spread throughout his frame. Often he wished to lave his fevered limbs in the brook so near, but when, as of old, he bowed down his great head, the waters sprang back. The wind, seeking to comfort him, sung a lullaby as of yore, rustling through his leaves, but only succeeded in shaking them to the ground. Little by little the old tree failed, until before long he stood a gnarled and twisted skeleton in the brown meadow, though blasted, not at rest, while the long Spanish mosses chuckled fiendishly with every breath as they sucked the last vitality from the trusting live oak tree.

In the deep cañon, far in the recesses of an overhanging rock, dwelt the ugly stone. The little brook running swiftly below her laughed as it leaped over the rocks, for it was a handsome little brook, and the sunbeams kissed its dancing wavelets and the nodding flowers drooped their heads upon its bosom. The flowers, too, were happy, for all who passed exclaimed at their beauty and gathered great handfuls of them. The glittering mica and pyrites were happy, for their sparkling colors attracted attention and the leaves and birds loved to view them. All were happy and contented but the little ugly stone; none spoke of her, none admired her, none were kind to her, except the waving ferns and the gentle south wind, for her form was displeasing to the view and none could see the beauty of her soul. Only the wind whispered gently to her in the starry night, when all things were asleep—whispered of the waving palms and of the placid, flowing rivers, of the cities and forests. Only the ferns sang low songs of the stars and rains, of the brooks and hills. But still the little stone was discontented and longed with a mighty longing for beauty and adulation.

Ages came and went, the years rolled on, and still the ugly stone remained as before, but her old-time companions had all disappeared. The brook had gone, the flowers had long since faded away; nought remained but the gentle south wind. One day the little stone felt herself seized and lifted out of her life-long home; a man, bearded and brown, looked long and piercingly at her. A blow from his hammer and the poor little stone crumbled into atoms, leaving in his hand a single crystal drop flashing with many colors. Then the south wind laughed softly to himself as he sped away over mountain and field. "Generations of books may rise and sink, but the true worth in the ugly stone remained eternal."

THE BIRDS VICTORIOUS.

[An Incident of Field Sport.]

By M. B. M. Toland.

A sportsman once, in search of game,
While beating through marsh tangle-wood
Upon a mother partridge came
Surrounded by her callow brood,
All fluttering helplessly.
By true maternal instinct taught,
She strove her little ones to hide,
Then bravely the intruders fought—
With flushing pinions spreading wide
She stood defiantly.

In stilted rage she forward came
With open beak and ruffled crest;
Her mate meanwhile, with cunning aim,
The spoiler and his dogs to breast
And lead them all astray—
Intoned quick measured melody
Of cooing-silvery cadence clear,
While flitting through the shrubbery,
Thus to attract the hunter's ear
His threatening hand to stay.

Transfixed in admiration mute,
The sportsman watched the tiny pair;
Nor wished he such brave birds to shoot,
But let them trill in triumph there
Their notes of victory.
His setters fenced in covert drear,
Intent in crouching attitude,
He called, and they, snbdued, drew near
With whimpering whine and sullen mood
To cross the fern-hedged lea.

God, who hath taught the birds in spring
To frame and build their downy nest,
To shield their young 'neath hovering wing,
Implanted in each parent breast
Some portion of his love.
Nor leaves them void of heavenly light
Wherewith to guide their simple life,
But aids them on their upward flight
Through changing scenes of peace and strife,
His watchful care to prove.

DULCET DAYS IN THE HAMPSHIRE HILLS.

By Charles Hallock.

Were there ever days more charming, summer haunts more satisfying, skies so bright, sun more genial, atmosphere so pure? Did mountain brooklets ever run more clear or hardwood forests wave their fronds more winsomely? Was ringing call of bluejay ever so resonant in the glen? And where did mother partridge ever brood her fledglings in glades so undisturbed?

For season after season it has been my blessed privilege to see the vernal buds unfold and the autumns ripen in these restful Hampshire Hills; and I have watched each changeful growth develop onward toward maturity with an interest that fell little short of Druid worship—deriving such a sense of abiding comfort as no other spot on earth bestows on me. Perhaps it is because my grandparents lie in the Plainfield churchyard, where I have watched for more than half a century the twin hemlocks, which stand sentinels over them, steadfastly fulfil their jealous trust and gradually extend their protecting limbs; or perhaps it is because my childhood's associations intensify with lapsing years and advancing age. No matter. In the spring time all the bluebirds and thrushes join in carolling forth the praises of these, their native haunts; the peep-frogs in the meadow chirp in unison; the bees take grateful wing o'er new-found flowers, and the skunk cabbage and fiddle-head brakes spring forth into luxuriant sweep of foliage. It is charming! All through the joyous summer months the landscape glows with vigorous life, and in autumn the big, round, yellow, harvest moon attests the fulfillment of every golden promise.

It is then I love to sniff the pungent aroma of incipient decay—the fermentation which precedes the inevitable mould and fungus—and I feel like lying down in the still woods and letting the juncos and robins cover me up with the crisp and rustling leaves, content and joyous to the end. I dare say that primitive Eden was no better place than this—the Eden which our first parents had to be *driven* from by flaming scourge; and yet in these latter days these delectable hills have been voluntarily abandoned by their tenants! Few remain to possess and occupy.

* * * * * *

It is too bad!

Follow an old country road in any direction among these hills in Northwestern Massachusetts, and you are sure to come eventually to some old ruin, a weed-choked cellar hole, or at least to a neglected orchard or a tumble-down stone wall. On either side the old fields are overgrown with thrifty young forests, and you will often find pine trees and tamaracks mingling familiarly with sturdy apple trees of doubtful fruitage; and in June and October the attentive ear will detect the muffled drum beat o the partridge, which seems afar off down the glen, but is probably within the spruce copse close at hand. Yonder at the cross-roads, where there is a lusty poplar grove, striplings of two generations gone dropped potatoes for the hired man to cover, and from the weathered stumps which clustered in the clearing gathered many a wasp's nest packed full of juicy grubs, to be used for bait for trout. Down in that tangled ravine stood a busy satinet factory, of which scarcely one iron bolt or brace remains. It would be a good place to fish for trout now, were it not for the brushwood completely choking up the stream and covering it out of sight. The searching sunbeams do not even penetrate to "where the trout hide," but we know the stream is there all the same, for we can detect its muffled babbling, like the crooning of an old woman in the chimney corner; and perchance, if we listen attentively, we may hear a muttered tale of some of the by-gone years. Ah! me. The old orchards which were once used for mowings now do niggard duty as pastures, while the pastures themselves are overgrown with scrubby ferns which conceal the multitudes of rocks, and are of no use at all. Cornfields and garden patches have long since grown to jungle, and the birch saplings and beeches are stoutest where the old

cellar holes are deepest. Even the purple fireweed which always followed the burnt land of the clearings has totally disappeared, and its place is usurped by the dog-wood and poison ivy. There has not been a new clearing for fifty years! And the aggravating part of the whole business is that a vagabond crow, which keeps up a bawling from the top of a neighboring rampike, actually presumes to resent our intrusion, and wakes up a whole colony of his black imps, who join in a lusty guffaw as they take wing. It is the unkindest cut of all!

It was a hard and unseemly fate which drove our fathers from their homes and scattered them abroad. Cold-blooded economists tell us it was avarice, restlessness and love of gain which impelled them; but we, who have lived among these granite hills and love them all so well, know the inexorable "cinch" which vicissitudes of trade and change of markets "get" on a man. Think you, indulgent reader, upon mature reflection, that mere love of novelty and lucre would of itself have kept these wandering argonauts so long away from the ancestral farms, while their infirm old parents lingered, and perhaps languished in solitude through a prolonged old age?

Let us not believe it.

When the country was first settled the population was circumscribed and the methods of livelihood crude and simple. Isolated little communities supplied their own frugal wants. Home demands nurtured home industries, but the thriftiest were not enriched. There was no currency and small use for credit, except in kind. Since then locations more suitable for agriculture have been discovered and occupied. Steam and electricity have supplanted the brawling mountain streams which erst were utilized for scores of manufactories, just as in still earlier times they had afforded the only thoroughfares for inland travel. And now it is a full generation since the young energies of these hill families went out into the West and to the metropolitan centres to seek the fortunes which never could be won at home. Surely, natural instinct must soon drive many of them back, after so long an interval, to rehabilitate their ancestral domains with their accumulated wealth, and so light up the family hearthstones once more with life and joy. Why may they not return to bless and receive the blessing? A few survivors are still waiting for them. Enough of gain is enough. Or would these busy toilers consume all their lifetime in the effort to be millionaires, and so permit the infirm old people on the homesteads to close each other's eyes as best they may, while their breath goes out with unsatisfied longings and vain regrets? Why, a dollar in the Hampshire hills will go as far as ten in the whirl of fashion or the business swim—yea, farther than a hundred! And how much true happiness might be doubly earned in restoring the old places, painting up the weathered houses, reshingling the barns, embellishing the lawns, rejuvenating the pasture-lots and the old fields, cutting out the tangle by the roadside, setting up the tennis nets, and collecting the waters of the errant brooks for trout ponds! Place the old people out on the porch in their easy chairs and let them watch the progress of the innovation. It would be like the development of a new world to them. If the absentees cannot come to abide permanently, let them fix here their summer homes. Here is present choice of pretty houses, now tenantless, for the trifling rent of thirty dollars per year; or you can buy the house with plot of ground outright for the paltry sum which the rich man lavishes on a livery for his coachman or an afternoon lunch. Why follow the *ignis fatuus* of caprice and fashion to inhospitable parts, where envy and rivalry for precedence and love of display are the animating impulses? *Here* is peace *and rest.*

Are there any localities in the land more capable of embellishment and improvement? The whole region is like a park, with mountain views and bucolic scenes inimitable. Nature has fashioned it with rounded lines of beauty, and presented it in every conceivable form to please the summer sojourner. These old hill farms have commanding sites. Very few of them lie in the valleys because there are no valleys! Wherever there is a valley there is a ravine and a tumbling stream, with barely breadth enough for a wagon road, over which the interlacing foliage forms an arch. Were ever drives more shady or more rustic! No

railroad within a dozen miles! Some would call them lonesome, but here is where solitude is most charming. The only wayfarers are the barefooted school children who trip their daily two-mile walks as though it were a pastime. There are no tramps—no thieves—for there is nothing to steal. There are no locks on the houses and the barndoors stand wide open. The old water troughs where we used to drink when children are demolished, and the trickling spring runs along the middle of the road and wears gullies in the sand and gravel. The "thank-you-marms" are worn level, and the guard rails are out of place, for the townspeople don't "work the roads" any more. There is not travel enough to justify the labor and expense. As we climb the hills out of the valley each foot of altitude expands the view. Some of the distant mountain ranges are superb. Directly below us is the valley panorama, with the old mill ponds dwindled into pools and the face of the brook revealed at intervals through the hovering alder-bushes. Hard by on the "side hill" is a rickety cottage and an old man. He fixes a clear and basilisk eye on the wayfarer, but there is no recognition, and he turns away as if only a blank were before him. Poor old man! He is ninety years old! Once he was selectman, and afterward deacon. In those days it was the custom of the country to raise the hat, or nod, even when strangers met. It is different now, and he wonders at it. His son's family live in Boston, and so an old woman of seventy does the housekeeping for him. There are no other occupants of the cottage. When the church bell tolls next year or the year after, the townspeople at the centre will unfasten the padlock which secures the rickety hearse-house door, and a string of shabby one-horse teams and two-seated buggies will follow the vehicle to the already populous churchyard. The small party of rapidly diminishing survivors always attend to this last duty with scrupulous exactness. It is all that they are able to do.

Shades of our goodly forefathers forbid that strangers should possess our heritage! Here in these sacred hills is the last remaining nursery of the pure indigenous native type. Here are the old houses, the old furniture, the old methods and manners; the straight-backed chairs, the towering clocks, the mammoth chimney places, the elaborate carvings, the warming pans, the andirons, the candles and the snuffers. Foreigners have never yet ventured in. Even a negro is a living curiosity. Let us jealously preserve the few last remaining acres of our New England hill country and colonize them, not with unsympathetic Scandinavians and French-Canadians, but with summer cottagers who are proud to recognize the kinship of the Yankee pioneers who peopled these delectable though rugged lands. Then, indeed, in the near future, will there be Dulcet Days for the Hampshire Hills.

ON THE "GILA MONSTER."

By Professor S. Garman.

Late in May, 1889, through the kindness of Miss Mary Woodman, the Museum of Comparative Zoölogy at Cambridge, Mass., came into possession of an unusually handsome specimen of the "Gila monster," one of the largest of the lizards and the only one reputed venomous. He had been secured at Casa Grande, Arizona, by Mr. Daniel H. Bacon and forwarded in such a manner as to reach us little the worse for the handling and the change of climate. His arrival in good health and in the warm season gave opportunity for taking a number of notes that may add something to what is already known concerning the species. For more than a year he was kept alive and under observation. Animals that have been brought any distance usually arrive very thirsty, and the first move toward domesticating them is made in giving them water. Heloderma was no exception. In an arid dwelling place such as his, four or five days, the length of the journey, would not be expected to prove a very long time between drinks, but he drank as if nearly famished. A stupid and impassive appearance did not prevent such manifestation of intense enjoyment as made it a pleasure to watch the slow process of satisfying what, for the time, was the greatest desire of the creature's existence. More than half an hour elapsed from the time the snout was brought down to the liquid and the tongue thrust into it until the head was raised and, licking the lips and yawning to disclose the inky blackness inside the mouth, preparations were begun on a sleeping place. Shortly afterward an egg was broken into a dish and placed within reach ; it was taken with evident relish, in the same manner as the water ; the chin was dipped into it and the tongue thrust out, bent downward and drawn back again. The tongue is thick and riband-shaped, *i. e.*, long, narrow and somewhat depressed. In protrusion it first makes its appearance as a single sharp point ; as it comes farther out the tip separates into two points, and the organ is seen to be forked for a short distance. When fully protruded, the aspect is changed and the outline of the extremity, as seen from above, resembles that of the tail of a shad. As the tongue is drawn in, the tips approach each other till once more closely applied. Thus, the forked portion moves sidewise like the blades of a pair of scissors as the tongue goes out and back. Any of the fluid that adhered was carried into the mouth by the retraction, and no doubt the tongue was followed by a slight current induced by suction that took in a little more ; the amount of suction, however, must have been very slight, judging from the time occupied in eating a single egg. On each of four days one egg was consumed ; then followed a week of fasting, the most of which was cloudy weather. Readiness to feed depended greatly on the temperature and brightness of the day ; in consequence the meals were quite irregular.

On the bottom of the box there were some inches of sand with several rocks ; under the side of one of the latter the burrow was made. The digging was all done with the hands ; beginning with the left the sand was thrown back with some force in slow strokes, about thirty to the minute, then the right was used in the same way. The motions were outward or lateral, not vertical like those of a dog. For a while the sand was dug out directly, until it began to pour back ; then a position was taken up on the top of the heap that had been made, and it was thrown still farther back ; gradually working forward, conditions were soon made favorable for continuance of excavation at the bottom of the burrow. At the depth of about a foot the body was hidden and only the tail exposed. This depth appeared to be satisfactory for a time, and the dwelling was occupied as if complete.

The tail is club shaped, near six inches in length by one and a half in diameter, and retains its thickness back toward the end where it rather abruptly tapers to become more slender and pointed. When the tail was sticking out of the excavation, as in digging, the slender extremity moved from side to side, back

and forth and around, with more flexibility than was to be expected from its size, as if constantly on the alert for unseen danger. The organ is very sensitive. While asleep the tail was stowed as if to insure its safety; it was either extended directly back into the burrow, half of the body remaining outside, or, when the animal was wholly under cover, it was bent forward along the side. In sleep, the body lies flat on the sand and the arms were usually stretched back, palms upward. After a few weeks less care was taken in regard to entering the burrow during the day, and the naps were taken anywhere in the box.

The box was not well placed for the sunshine; it was covered with a strong netting. Some attempts to get through the net one morning caused the occupant to be taken by the shoulders and lifted over into another cage where he might get the full benefit of the sun. This was quietly enjoyed until the sun had passed, then there was another attempt on the cover, followed by return to the first box and retreat into the hole. This came to be the regular proceeding. Every morning about 9 o'clock the fellow climbed up in the corner of his box, whence he was lifted over into the sunshine to take a nap until the shadows came upon him, then he would climb in the corner again till returned to the larger box to take his favorite position in his den for awhile. To forget or neglect him was out of the question; his scratching would not permit it.

The number of eggs charged to him does not average more than one per week; the other food given him amounted to very little.

In the latter part of July he began to slough. The epiderm came off in a very ragged way, in shreds and patches. There seemed to be no effort to hasten the process, and a month later it was not entirely finished. Thinking to hurry the matter, in case all had not gone along in the normal way, a bath tub was furnished with water sufficient to completely cover him. At once he showed a fondness for lying in the water with his snout sticking out; this was varied by lying on the bank with his tail sticking in, a position which he apparently found to be very delightful.

Heloderma was really good natured. To be sure he was easily worried into self-defense, but there was nothing vicious in his disposition. To scratch him on the sides, or rub the knobbed scales of his back, or, more readily than either, to blow in his face would make him open his mouth, for which he was not much to be blamed, but even then something had to be put between his teeth to get him to bite, he had so little desire to take hold of his tormentor.

His thirst required more attention than his hunger; he drank frequently and always with great deliberation. To tempt his appetite various things, such as insects, worms, young birds, mice, meats and cooked foods were put before him. He took none of them voluntarily, but would swallow occasional offerings if they were put into his mouth. Some things he would not accept on any terms, they were put out of the mouth as fast as put in; others that he might be induced to swallow were held in his jaws for a long time. At the end of a year the only evidence of loss of flesh was to be noticed near the end of the tail, where it had grown a little more thin and pointed. The body had retained its plumpness, being rather more than three and a half inches wide to twelve inches long, without the tail.

His only sound was a long-drawn aspirate hah! like a sigh produced by expelling the breath from the lungs. If teased till out of patience, this was given out with the mouth partly open, when it had all the force of a warning; whether it was intended for that purpose or was merely preparation for a struggle, by lessening the bulk, are still to be considered. It really answered both purposes.

In regard to the nature of the venom and fatality of the bite there is little to offer that is new. The results of the experiments suggest danger for small animals but little or none for larger ones. Large angle worms and insects seemed to die much more quickly when bitten than when cut to pieces with the scissors.

Acquaintance with this specimen has satisfied me, however, that the reports of the deadly nature of the species are mainly exaggerations, with little, if any, foundation in fact. Popular opinion, and, for that matter, its manner of origin, are illustrated by the following, credited

to Col. A. G. Tassin, U. S. A., in the *Overland Monthly:* "The Gila monster is an ugly reptile peculiar to Arizona, and, as its name implies, most common along the Gila River. It is a sort of a cross between a lizard and an alligator, roughly striped black and white on a yellowish background. Its length varies from ten to thirty inches, and a large-sized fellow is as thick as a strong man's arm. When prodded with a stick it hisses and thrusts out its heavy forked tongue, raising its head menacingly, but scarcely moving otherwise. Its bite is often fatal, the effect depending more or less upon the state of the saurian's temper and the depth of the wound. Its breath in hissing is offensive, and issues from a wide-open mouth in puffs of black vapor or smoke, The Mexicans I have questioned all told me that it was exceedingly poisonous, as much so as the bite, if not more, while many of the Americans thought it harmless. Having myself seen a chicken and a small puppy killed by the hissing of one in their faces, I am inclined to think that it is best to keep from coming in contact with it." Comment on this is unnecessary. Still more conclusive in its way is the following, originally from the *Cochise Record*, reprinted without comment in the "Proceedings of the Zoölogical Society of London," 1888: "Sunday evening Dr. Matthews was summoned by telegram to Fairbanks (a railway station near Tombstone, Ariz. Ter.) to attend Col. Yearger, who was reported seriously ill. Owing to delay in the telegram, the doctor did not reach the patient until several hours after his death, which had been very sudden.

"It appears that Yearger had been fooling with a Gila monster, and in attempting to open the creature's mouth was bitten on the right thumb. Instantly the poison took effect, and, although every convenient remedy was applied, he lived but a few hours. An inquest was subsequently held, and a verdict returned in accordance with the above facts.

"As this is the third or fourth death which has occurred in the Territory from bites of this reptile, it should set at rest, at once and forever, the theory so prevalent that their bite is not poisonous."

For comparison with the foregoing we may bring forward the evidence of a couple of witnesses of scientific reputation. They have no interest in destroying the character of the accused and may be expected to give testimony without prejudice. If they are less positive in their assertions than the preceding, it is possibly due to to their actual acquaintance with the creature.

Dr. E. Sumichrast, under date of 1880, in the Bulletin de la Société Zoologique de France, page 178, remarks concerning *Heloderma horridum:* "J'ai peu de chose à ajouter aux observations de moeurs que j'ai publiées sur cette espèce, il y a quelques années, si ce n'est, qu'après de nouvelles expériences sur sa morsure, je suis arrivé à la conviction qu'elle occasionne rarement la mort chez les animaux d'une certaine taille et que, la plupart du temps, elle n'est suivie que d'une enflure de la partie mordue qui disparait au bout de vingt-quatre heures au plus; c'est au moins le seul effet qu'elle ait produit sur plusieurs jeunes chiens que j'ai fait mordre dernièrement."

Dr. R. W. Shufeldt is one who, from having been incautious enough to get bitten, is entitled to speak with some degree of assurance. His statement is found in the *American Naturalist* for 1882, page 908. He was bitten on the right thumb, the teeth going to the bone, by a specimen at the Smithsonian Institution. The lacerated wound was in a few moments the starting point of severe shooting pains that passed up the arm and down the corresponding side. A profuse perspiration was induced. The pain made him so faint as to fall. The hand swelled rapidly, but the swelling went no farther than the wrist. The treatment included suction, which drew not a little blood from the wound, a small quantity of whiskey, external application of ice and laudanum and a lead-water wash afterward to reduce the swelling. He passed a sleepless night. By the next day the swelling was considerably reduced and thereafter disappeared gradually. The following is the conclusion of the Doctor's statement: "Taking everything into consideration, we must believe the bite of *Heloderma suspectum* to be a harmless one beyond the ordinary symptoms that usually follow the bite of any irritated animal. I have seen, as perhaps all

surgeons have, the most serious consequences follow the bite inflicted by an angry man, and several years ago the writer had his hand confined in a sling for many weeks from such a wound administered by the teeth of a common cat, the even tenor of whose life had been suddenly interrupted."

The most conclusive of my own experiments on the subject of this notice, *H. suspectum*, eighteen inches in length, was made with a young cat less than one-third grown. The cat was bitten on the right hand and wrist, the lizard holding fast like a bull dog, and blood was seen to flow when they were released. That there might be no doubt of the effectiveness of the bite, in two minutes the teeth were inserted a second time, the saurian retaining his hold and sinking his teeth deeper as the cat struggled to get free. For half an hour or more the wound occasioned some distress and was licked and dressed by the kitten, which then went to sleep for about an hour and a half. In expectation of its death it was left undisturbed. To my surprise it awoke as lively as if nothing had happened. Though the hand was somewhat swollen, it was but slightly lame. Twenty-four hours afterward, when it was as bright as ever and apparently without ill-effects from its mishap, the same cat was again bitten twice on the forearm, a little higher than before. As in the first experiment there was no room to doubt the penetration of the teeth. The cat again licked the wounds and for a considerable time was occupied in dressing them. There was no disposition to go to sleep as on the day before. In two hours, as soon as the cat was inclined to pay no farther attention to its wounds, it was killed and the skin removed the better to note the effects of the bites. The forearm and hand were found to be swollen to twice the size of the opposite hand and arm. The track of each tooth was marked by the blood in and close around it, and the number and depth left no doubt of the conclusiveness of the experiment; the teeth had gone to the bones and between them. I saw nothing by which to distinguish the cuts from those made by a needle. There were no signs of disorganization in either the first or the second bites. Nothing could be seen in the way of discoloration or otherwise to give reason for any other conclusion than that the kitten would have entirely recovered in a few hours, by the time the swelling had gone down, if it had been allowed to live.

The outcome of such observations as have been made on this specimen has been confirmation of the opinion that the species is venomous to a certain degree, to an extent that, while it may most often prove fatal to very small animals, is only in exceptional instances deadly or perhaps even dangerous to larger ones. The effect on the kitten was identical with that on the puppies in Sumichrast's experiments. That poison was introduced by the bite was evident from the distress and swelling occasioned.

Dr. Fischer has described and figured secretory apparatus on the lower jaws; no glands have been found on the upper. There is an important question to be solved in connection with this apparent lack of venom-secreting organs on one of the jaws, which is quite as well prepared for its use as the other on which the glands are so well developed. On both upper and lower jaws each tooth has a lateral groove on each side; these furrows are supposed to be for the purpose of inserting the venom in the wounds made by the teeth. Unless there are, not yet discovered, means of supplying venom to the upper teeth, it is difficult to see how their furrows are made available, if not by means of a quantity set free in the mouth, from the lower jaws, before the attempt to bite, a process of such uncertain efficacy as hardly to be considered probable.

Averse to torturing the creature, no attempt was made to verify the statement made by Sumichrast concerning the habit of turning on the back to defend itself when struck or beaten with a club. However, it might be expected to do just what is asserted of it under such circumstance, for the position would be that which would enable it most effectively to use feet and claws in aid of the teeth in self-defense.

The breath is no more colored than that of human beings; neither is it nor could it be any more offensive in its odor than the incense wafted from the lips of multitudes of the representatives of proud humanity. In regard to

the breath being venom-laden, that of the specimen before us certainly was not so; here again it would be no very difficult undertaking to select an army of men with whom a comparison in this respect would undoubtedly prove complimentary in the "monster."

And, finally, it may be said that unprejudiced consideration of the matter as it stands between the reptile and his detractors, will not fail to convince any one that a great deal of the disrepute with which so much of the testimony is weighted should not by any means be attached to the lizard.

THE ALLIGATOR OF FLORIDA.

By Isaac McLellan.

Clad in his iron coat of mail,
Cuirass and helm and corslet-scale,
Like harness'd knight in tented field,
With breast-plate and his brazen shield,
This monster grim, in escalade,
Defies the bullet and the blade,
Like the dark tenant of the Nile,
The fierce, unwieldy crocodile,
Proud in impenetrable strength,
Who, stretched on mud-flat all his length,
With gaping jaw and lashing tail,
Encrushes all who may assail.

Amid thy swamps and stagnant creeks,
Where air with foul miasmas reeks,
Oh! Florida, famous for thy flowers,
Thy green, thy semi-tropic bowers,
Thy lemon groves, thy orange blooms,
Magnolias fainting with perfumes,
Thy natural gardens, brimming o'er
With flowerets, a delicious store,
Thy rivulets clear, thy rivers grand,
That fertilize thy bounteous land,
Thy mirror'd bays, where swan and goose
Their winnowing pinions free unloose,
Where fly the red-head and the teal,
Dense squadrons of the black-duck wheel;
The canvas-back and wood ducks speed
Across the marsh and yellow reed;
There, lurk'd in bay and salty sound,
The alligators grim abound.

Each estuary of the shore,
And where the whirling eddies pour,
Each dusky pool, each shelly cove,
Are dangerous where thy numbers rove.
No mortal and no creature may
Unmenaced cross the watery way;
Against thy jaws and sweeping tail
No speed, no valor may avail.
The fishes are thy lawful prize,
The mangrove snapper, gay with dyes,
Cavalli and the grouper red,
And mullet, thy assaultings dread,
And jewfish and the tarpon great
Meet in thy jaws a tragic fate.

THE HERMIT THRUSH.

By Stewart E. White.

It is the twelfth of May, and, although the sky forbids and the air feels like rain, I am again n the old pines, for it is the height of the season and the woods are filled with the countless hosts of warblers. The buds have awakened from their long sleep, and, half opening, adorn the trees with a delicate lace-like sprinkling of green that later, when fully developed, is lost in the abundance of foliage. The air is still with the breathless calm that precedes a rain, and even the sprightly songs of the warblers, at other times so welcome, now seem out of place. Far off in the forest a low preliminary sighing is heard, and the clouds, that have stolen up unnoticed, shut off even the infrequent bursts of sunlight that were before enjoyed. With a sudden roar the storm bursts, accompanied by sheets of rain.

The songs are instantly hushed and only a few frightened calls are heard from the misty figures so busily seeking shelter. As for myself, I am well hidden under the leaning body of a fallen tree and can afford to laugh at the wet. As suddenly as they came the storm clouds roll by and the sun, bursting forth, illumines each crystal drop, flashing it forth in many colors, arraying the forest in Nature's most beautiful and precious jewels. Even while all Nature hangs breathless and appalled after this outburst, from the darkest depths of the woods far off rises a beautiful hymn of thanksgiving. Clear, yet soft; sweet, yet with such power that it can be heard in all parts of the woods, one listens entranced. The expression is one of perfect peace; no earthly joy rings in this strain, no harsh notes or abrupt pauses, but one feels that its author must have passed all trials and temptations, and must be repeating the melody of another world. For a time the superb performer has no rivals, but soon the much-vaunted wood thrush takes up the strain; although he repeats nearly the same notes, there is a sharper metallic ring that jars on the soul after listening to his peer, the hermit thrush.

A change of scene. I was sleeping in my bed, the sound sleep that visits mortal beings just before the dawn. My dreams were ravishingly sweet, a confusion of violets and sweetly smelling thyme, a soft, delicious radiance was about me, and silvery tinkling notes broke gently on my ear. The thyme and violets gradually wafted their airy selves away, the soft radiance paled, but the silvery notes still remained connected and rising in glorious cadence just outside my window. The green expanse of maple leaves waving slowly to and fro served to hide the glorious performer from the golden beams of the newly risen sun, but could not quench the fountain of melody concealed in a little bird's yellow throat. For two hours I lay in dreamy forgetfulness drinking in the harmony, enjoying a treat of unpriced value, yet within the reach of all.

I love to watch the progression of this bird from the moment when, early in the spring, he appears, skulking shyly through the woods. He comes as early as the middle of April, beguiled to the North by the softening of the weather, only to find his old haunts open and bare. Out of his natural element and sure refuge, the green leaves, his confidence is gone, and he keeps well out of sight, uttering but a deprecatory cry. On your approach he skulks aside into the densest thicket, even that, alas! too thin for concealment; but it is the best to be had, so in its vicinity he stays, rarely ascending beyond the lower limbs of the trees. As the foliage matures he contents himself with flying from his feeding ground among the dead leaves to the nearest branch, where he silently sits, eyeing you sharply, slowly waving his tail up and quickly down. His bright eyes no longer wear the hunted look, but gaze freely at you, conscious of supremacy in his chosen kingdom.

Hermit by force of circumstances, not by inclination, he avoids not the approach of living beings, neither does he seek their company. The freshest, coolest and most delightful woods are his; the woods where the trees are tall, the underbrush soft and green, underfoot are the

ferns and cool mosses. Here the sunlight, broken by the sieve of leaves, falls in a golden shower, and the tiny brook creeping through the cresses lingers as if loth to leave. Here, as in the pines, is a solemn stillness, but in this case animate Nature seems not to intrude. Here the rat-tat-tat of the woodpecker, the ceaseless warbling of the vireo, the rustling whisper of the wind, the barking of the squirrels, even the lowing of cattle, seem each to have its place and to add to and become a part of the beauty of the spot. At the foot of the elm, shadowed with ferns and hairbells, is a still pool of crystal water; it is the bathing place of the fairies. Well our friend knows the spot, bordered by verdant shores of moss, and often of an early morning may he be surprised here at his toilet.

The last of May comes on apace; visions of a summer home arise before the thrush, for already the oven bird has claimed the woods as his, and it is time to move.

Did you, when you heard him before, think this to be the finest musician the world has ever seen? Now your decision is doubly, triply confirmed. From the shores of the lake the bluffs rise, covered with cedars and firs. As evening approaches a single liquid note is heard close at hand; a moment's pause, and it is answered farther on. Then rises the grand anthem as before, richened and completed by the ripening fires of love. Far down the cliff another replies, then another and another, until the air trembles with the melody. Little by little it becomes less intense, one by one the performers are silent, until at last, with the rising of the moon, perfect stillness broods over the land.

The summer wears on; domestic cares silence the musician, for such earnest hard work as he is now called upon to do is incompatible with song. The youngsters manifest a perplexing disposition to place themselves in dangerous positions, from which it is necessary that they should be extricated. Their mouths are always open; they must be guided in their early aerial efforts. Altogether the situation is so worrisome that it is no wonder that his former cheerful note is changed to a harsh *pwe*, delivered in an inquiring tone of voice that is positively ludicrous. His anxiety is such that he will decoy with the greatest of haste for almost any kind of a "screeping" noise. Gradually the youth of the family acquire a knowledge of the world and its ways, and before long are as well able to take care of themselves as are their parents.

The southward migration begins about as we would wish to return home ourselves, so we are thus enabled to watch him in the closing scene of the year. His homes are now on the sere hillsides, where the trees have dropped their leaves, where the grouse rises with a mighty roar. In thinking of the hermit thrush in fall a certain scene always rises to my mind. It is the side of a long, wooded slope. Here and there stands a scrub oak, the dried leaves rustling in the wind; the thrush is always a little in advance, striking an attitude on a cross limb, flitting so silently on that his figure is almost elf-like in its strangeness. On all sides are these phantom shapes, always silent and watchful. One day they disappear, and the year with the hermit thrush is ended. In his southern home, no doubt, he enjoys life as well, but for us alone he keeps the sweetest, most beautiful phases of his life.

HENRY WARD BEECHER ON THE LOVE FOR FLOWERS.

Happy is the man that loves flowers! Happy, even if it be a love adulterated with vanity and strife. For human passions nestle in flower-lovers too. Some employ their zeal chiefly in horticultural competitions, or in the ambition of floral shows. Others love flowers as curiosities, and search for novelties, for "sports," and vegetable monstrosities. We have been led through costly collections by men whose chief pleasure seemed to be in the effect which their treasures produced on others, not on themselves. Their love of flowers was only the love of being praised for having them. But there is a choice in vanities and ostentations. A contest of roses is better than of horses. We had rather be vain of the best tulip, dahlia or ranunculus, than of the best shot. Of all fools, a floral fool deserves the eminence.

But these aside, blessed be the man that really loves flowers!—loves them for their own sake, for their beauty, their associations, the joys they have given and always will give; so that he would sit down among them as friends and companions, if there was not another creature on earth to admire or praise them. But such men need no blessing of mine. They are blessed of God! Did He not make the world for such men? Are they not clearly the owners of the world, and the richest of all men?

It is the end of art to inoculate men with the love of Nature. But those who have a passion for Nature in the natural way need no pictures nor galleries. Spring is their designer, and the whole year their artist.

He who only does not appreciate floral beauty is to be pitied like any other man who is born imperfect. It is a misfortune not unlike blindness. But men who contemptuously reject flowers as effeminate and unworthy of manhood, reveal a certain coarseness. Were flowers fit to eat or drink, were they stimulative of passions, or could they be gambled with like stocks and public consciences, they would take them up just where finer minds would drop them, who love them as the revelations of God's sense of beauty, as addressed to the taste, and to something finer and deeper than taste, to that power within us which spiritualizes matter, and communes with God through His work, and not for their paltry market value.

Many persons lose all enjoyment of many flowers by indulging false associations. There be some who think that no *weed* can be of interest as a flower. But all flowers are weeds where they grow wildly and abundantly; and somewhere our rarest flowers are somebody's commonest. Flowers growing in noisome places, in desolate corners, upon rubbish or rank desolation, become disagreeable by association. Roadside flowers, ineradicable, and hardly beyond all discouragement, lose themselves from our sense of delicacy and protection. And, generally, there is a disposition to undervalue *common* flowers. There are few that will trouble themselves to examine minutely a blossom that they have seen and neglected from their childhood; and yet if they would but question such flowers, and commune with them, they would often be surprised to find extreme beauty where it had long been overlooked.

If a plant be uncouth, it has no attractions to us simply because it has been brought from the ends of the earth and is a "great rarity;" if it has beauty, it is none the less, but a great deal more attractive to us, because it is common. A very common flower adds generosity to beauty. It gives joy to the poor, the rude, and to the multitudes who could have no flowers were Nature to charge a price for her blossoms. Is a cloud less beautiful, or a sea, or a mountain, because often seen, or seen by millions?

At any rate, while we lose no fondness for eminent and accomplished flowers, we are conscious of a growing respect for the floral democratic throng. There is for instance, the mullein, of but little beauty in each floweret, but a brave plant, growing cheerfully and heartily out of abandoned soils, ruffling its root about, with broad-palmed, generous, velvet leaves, and erecting therefrom a towering spire that always inclines us to stop for a kindly look. This fine plant is left, by most people, like a decayed old gentleman, to a

good-natured pity. But in other countries it is a *flower*, and called the "American velvet plant."

We confess to a homely enthusiasm for clover—not the white clover, beloved of honey bees—but the red clover. It holds up its round, ruddy face and honest head with such rustic innocence! Do you ever see it without thinking of a sound, sensible, country lass, sun-browned and fearless, as innocence always should be? We go through a field of red clover like Solomon in a garden of spices.

There is the burdock too, with its prickly rosettes, that has little beauty or value, except (like some kind, brown, good-natured nurse) as an amusement to children, who manufacture baskets, houses and various marvelous utensils of its burrs. The thistle is a prince. Let any man that has an eye for beauty take a view of the whole plant, and where will he see more expressive grace and symmetry, and where is there a more kingly flower? To be sure, there are sharp objections to it in a bouquet. Neither is it a safe neighbor to the farm, having a habit of scattering its seeds like a very heretic. But most gardeners feel toward a thistle as boys toward a snake, and farmers, with more reason, dread it like a plague. But it is just as beautiful as if it were a universal favorite.

What shall we say of mayweed, irreverently called dog-fennel by some? Its acrid juice, its heavy, pungent odor, make it disagreeable; and being disagreeable, its enormous Malthusian propensities to increase render it hateful to damsels of white stockings, compelled to walk through it on dewy mornings. Arise, Oh! scythe, and devour it!

The buttercup is a flower of our childhood, and very brilliant in our eyes. Its strong color, seen afar off, often provoked its fate, for through the mowing lot we went after it, regardless of orchard grass and herd grass, plucking down its long, slender stems, crowned with golden chalices, until the father, covetous of hay, shouted to us, "Out of that grass! out of that grass! you rogue!"

The first thing that defies the frost in spring is the chickweed. It will open its floral eye and look the thermometer in the face at 32°; it leads out the snowdrop and crocus. Its blossom is diminutive; and no wonder, for it begins so early in the season that it has little time to make much of itself. But, as a harbinger and herald, let it not be forgotten.

You cannot forget, if you would, those golden kisses all over the cheeks of the meadow, queerly called *dandelions*. There are many green-house blossoms less pleasing to us than these. And we have reached through many a fence, since we were incarcerated, like them, in a city, to pluck one of these yellow flower drops. Their passing away is more spiritual than their bloom. Nothing can be more airy and beautiful than the transparent seed-globe—a fairy dome of splendid architecture.

As for marigolds, poppies, hollyhocks and valorous sunflowers, we shall never have a garden without them, both for their own sake and for the sake of old-fashioned folks who used to love them. Morning glories—or, to call them by their city names, the convolvulus—need no praising. The vine, the leaf, the exquisite, vase-formed flower, the delicate and various colors, will secure it from neglect while taste remains. Grape blossoms and mignonnette do not appeal to the eye; and, if they were selfish, no man would care for them. Yet because they pour their life out in fragrance they are always loved, and, like homely people with noble hearts, they seem beautiful by association. Nothing that produces constant pleasure in us can fail to seem beautiful. We do not need to speak for that universal favorite—the rose. As a flower is the finest stroke of creation, so the rose is the happiest hit among flowers. Yet, in the feast of ever blooming roses, and of double roses, we are in danger of being perverted from a love of simplicity, as manifested in the wild, single rose. When a man can look upon the simple, wild rose, and feel no pleasure, his taste has been corrupted.

But we must not neglect the blossoms of fruit trees. What a great heart an apple tree must have! What generous work it makes of blossoming! It is not content with a single bloom for each apple that is to be, but a profusion, a prodigality of blossom there must be. The tree is but a huge bouquet. It gives you twenty times as much as there is need for, and

evidently because it loves to blossom. We will praise this virtuous tree. Not beautiful in form, often clumpy, cragged and rude; but it is glorious in beauty when efflorescent. Nor is it a beauty only at a distance and in the mass. Pluck down a twig and examine as closely as you will; it will bear the nearest looking. The simplicity and purity of the white, expanded flower, the half-open buds slightly blushed, the little pink-tipped buds unopen, crowding up together like rosy children around an elder brother or sister. Can anything surpass it? Why, here is a cluster more beautiful than any you can make up artificially, even if you select from the whole garden. Wear this family of buds for my sake. It is all the better for being common. I love a flower that all may have; that belongs to the whole, and not to a select and exclusive few. Common, forsooth! a flower cannot be worn out by much looking at, as a road is by much travel.

How one exhales, and feels his childhood coming back to him, when, emerging from the hard and hateful city streets, he sees orchards and gardens in sheeted bloom—plum, cherry, pear, peach and apple, waves and billows of blossoms rolling over the hill sides and down through the levels! My heart runs riot. This is a kingdom of glory. The bees know it. Are the blossoms singing, or is all this humming sound the music of bees? The frivolous flies, that never seem to be thinking of anything, are rather sober and solemn here. Such a sight is equal to a sunset, which is but a blossoming of the clouds.

We love to fancy that a flower is the point of transition at which a material thing touches the immaterial; it is the sentient vegetable soul. We ascribe dispositions to it; we treat it as we would an innocent child. A stem or root has no suggestion of life. A leaf advances toward it; and some leaves are as fine as flowers, and have, moreover, a grace of motion seldom had by flowers. Flowers have an expression of countenance as much as men or animals. Some seem to smile; some have a sad expression; some are pensive and diffident; others, again, are plain, honest and upright, like the broad-faced sunflower and the hollyhock. We find ourselves speaking of them as laughing, as gay and coquettish, as nodding and dancing. No man of sensibility ever spoke of a flower as he would of a fungus, a pebble or a sponge. Indeed, they are more life-like than many animals. We commune with flowers—we go to them if we are sad or glad; but a toad, a worm, an insect, we repel, as if real life was not so real as imaginary life. What a pity flowers can utter no sound! A singing rose, a whispering violet, a murmuring honeysuckle! Oh! what a rare and exquisite miracle would these be!

When we hear melodious sounds—the wind among the trees, the noise of a brook falling down into a deep, leaf-covered cavity—birds' notes, especially at night; children's voices as you ride into a village at dusk, far from your long absent home, and quite home-sick; or a flute heard from out of a forest, a silver sound rising up among silver-lit leaves into the moonlighted air; or the low conversations of persons whom you love, that sit at the fire in the room where you are convalescing. When we think of these things we are apt to imagine that nothing is perfect that has not the gift of sound. But we change our mind when we dwell lovingly among flowers, for they are always silent. Sound is never associated with them. They speak to you, but it is as the eye speaks, by vibrations of light and not of air.

It is with flowers as with friends. Many may be loved, but few much loved. Wild honeysuckles in the wood, laurel bushes in the very regality of bloom, are very beautiful to you. But they are color and form only. They seem strangers to you. You have no memories reposed in them. They bring back nothing from Time. They point to nothing in the future. But a wild brier starts a genial feeling. It is the country cousin of the rose, and that has always been your pet. You have nursed it and defended it; you have had it for companionship as you wrote; it has stood by your pillow while sick; it has brought remembrance to you, and conveyed your kindest feelings to others. You remember it as a mother's favorite; it speaks to you of your own childhood—that white rosebush that snowed in the corner by the door; that generous bush that blushed red in the garden with a thousand flowers,

whose gorgeousness was among the first things that drew your childish eyes, and which always comes up before you when you speak of childhood. You remember, too, that your mother loved roses. As you walked to church she plucked off a bud and gave you, which you carried because you were proud to do as she did. You remember how, in the listening hour of sermon, her roses fell neglected on her lap—and how you slyly drew one and another of them; and how, when she came to, she looked for them under her handkerchief and on the floor, until, spying the ill-repressed glee of your face, she smiled such a look of love upon you as made a rose forever after seem to you as if it smiled a mother's smile. And so a wild rose, a prairie rose or a sweet brier, that at evening fills the air with odor (a floral nightingale whose song is perfume), greets you as a dear and intimate friend. You almost wish to get out, as you travel, and inquire after their health, and ask if they wish to send any message by you to their town friends.

But no flower can be so strange or so new that a friendliness does not spring up at once between you. You gather them up along your rambles, and sit down to make their acquaintance on some shaded bank with your feet over the brook, where your shoes feed their vanity as in a mirror. You assort them; you question their graces; you enjoy their odor; you range them on the grass in a row and look from one to another; you gather them up and study a fit gradation of colors, and search for new specimens to fill the degrees between too violent extremes. All the while, and it is a long while, if the day be gracious and leisure ample, various suggestions and analogies of life are darting in and out of your mind. This flower is like some friend; another reminds you of mignonnette, and mignonnette always makes you think of such a garden and mansion where it enacted some memorable part; and *that* flower conveys some strange and unexpected resemblance to certain events of society; this one is a bold soldier; that one is a sweet lady dear; the white flowering blood-root, trooping up by the side of a decaying log, recalls to your fancy a band of white-bannered knights; and so your pleased attention strays through a thousand vagaries of fancy, or memory, or vaticinating hope.

Yet these are not home flowers. You did not plant them. You have not screened them. You have not watched their growth, plucked away voracious worms or nibbling bugs; you have not seen them in the same places year after year, children of your care and love. Around such there is an artificial life, an associational beauty, a fragrance and grace of the affections, that no wild flowers can have.

It is a matter of gratitude that this finest gift of Providence is the most profusely given. Flowers cannot be monopolized. The poor can have them as much as the rich. It does not require such an education to love and appreciate them as it would to admire a picture of Turner's or a statue of Thorwaldsen's. And, as they are messengers of affection, tokens of remembrance, and presents of beauty, of universal acceptance, it is pleasant to think that all men recognize a brief brotherhood in them. It is not impertinent to offer flowers to a stranger. The poorest child can proffer them to the richest. A hundred persons turned together into a meadow full of flowers would be drawn together in a transient brotherhood.

It is affecting to see how serviceable flowers often are to the necessities of the poor. If they bring their little floral gift to you it cannot but touch your heart to think that their grateful affection longed to express itself as much as yours. You have books, or gems, or services, that you can render as you will. The poor can give but little and do but little. Were it not for flowers they would be shut out from those exquisite pleasures which spring from such gifts. I never take one from a child, or from the poor, that I do not thank God in their behalf for flowers.

And then, when Death enters a poor man's house! It may be the child was the only creature that loved the unbefriended father—*really* loved him; loved him utterly. Or, it may be, it is an only son, and his mother a widow, who, in all his sickness, felt the limitation of her poverty for her darling's sake as she never had for her own, and did what she could, but not what she would had there been wealth. The coffin is pine. The undertaker sold it with a

jerk of indifference and haste, lest he should lose the selling of a rosewood coffin, trimmed with splendid silver screws. The room is small. The attendant neighbors are few. The shroud is coarse. Oh! the darling child was fit for whatever was most excellent, and the heart aches to do for him whatever could be done that should speak love. It takes money for fine linen; money for costly sepulture. But flowers, thank God, the poorest may have. So put white buds in the hair, and honey-dew, and mignonnette, and half-blown roses, on the breast. If it be spring, a few white violets will do; and there is not a month till November that will not give you something. But, if it is winter, and you have no single pot of roses, then I fear your darling must be buried without a flower, for flowers cost money in the winter.

And then, if you cannot give a stone to mark his burial place, a rose may stand there, and from it you may, every spring, pluck a bud for your bosom, as the child was broken off from you. And, if it brings tears for the past, you will not see the flowers fade and come again, and fade and come again, year by year, and not learn a lesson of the resurrection—when that which perished here shall revive again, never more to droop or to die.

THE AMERICAN CUCKOO.

By Dr. Morris Gibbs.

"Oh! cuckoo! shall I call thee bird,
Or but a wandering voice?"
—*Wordsworth.*

In your February issue an article appeared on the European cuckoo (*Cuculus canorus*, Linn.) Although our foreign cousin was well defined, there were no remarks made regarding the American cuckoos, and, thinking a few observations would not come amiss on the subject, I take the liberty of asking a part of your space.

In America, by which I mean all that portion of territory north of the Mexican border, we have four well-defined species: The black-billed cuckoo (*Cocyzus erythrophthalmus*), the yellow-billed (*C. americanus*), the mangrove cuckoo (*C. minor maynardi*) and the ground cuckoo (*Geococcyx californicus*). The latter species, found only in the southwestern part of the Union, is known as chapparal cock and snake bird by the citizens of California, Arizona, New Mexico and Texas. In Mexico, where it is more abundant, it is called pisano by the natives, and to the south there are, I am informed, several species which never extend their range to the Union boundaries. The ground cuckoo has many peculiar habits which are unlike those of any other bird of America. In the chapparal scrub in the barren tracts it may be seen rapidly passing among the brush and cactus growth in search of its prey, which consists of snakes, lizards, small mammals, and, in fact, anything of an animal nature; in addition to which a vegetable diet is indulged in. This cuckoo, which is the largest of the family, is nearly two feet long, and in its native haunts rarely resorts to its wings, preferring to escape or pursue its prey by the use of its strong legs. It can run with surprising rapidity, and cannot be beaten by a horse, I am informed. It must not be imagined that it is swifter on foot than a horse, but it is assisted in its speed by its wings, much as in the manner of the ostrich when pursued. This strange bird has the advantage over the ostrich, as it may escape in impenetrable thickets when closely pursued. From its habit of running directly ahead, when chased, on a road or path, it has received the name of road-runner.

The other cuckoos are better known in the East, where they are common and well known to all observers. They are about a foot in length, the yellow-bill being slightly the larger and readily distinguished by the bill, the lower mandible of which is yellow. In latitude 40° they appear about May 12, but occasionally not till much later, and quite as often earlier. The habits of the two species are so similar that they may be described together. The eggs are laid usually by June 15, but I have taken them in August, and under conditions that led me to think that two broods were reared. The eggs are elliptical in form and of a light blue color,

and generally have peculiar wavy markings of a lighter shade, giving them an appearance that distinguishes them from all other American eggs. Three eggs are usually laid, but quite commonly only two, while some biologists speak of sets of four in a nest. The nest is a very shiftless structure of a few twigs, and lined with catkins, leaves, and sometimes grass. The affair is almost level on top, and it is a mystery how the eggs are kept on the nest. The eggs are often laid several days apart, thus differing from general custom with our birds. In some nests I have examined a young bird was found along with two eggs in various stages of incubation. Again, two or three young of different sizes were found. Still I have seen young of a size in a nest.

It is generally allowed that our American cuckoos do not share the peculiarity of the European bird in laying in other birds' nests; however, this has been disproved in many instances where the European habit seems to have been introduced, more, however, as an exception than otherwise. One bird that we have, the cow-bird or cow-bunting (*Molothrus ater*), invariably lays its eggs in other birds' nests, leaving them to the entire care of the foster parents. This strange parasite was partially treated of in the January issue of NATURE'S REALM. It does not belong to the cuckoo family, but to the *Icteridæ*, and is a true blackbird.

In several instances cuckoos' eggs have been found in the nests of other owners, but the exceptions are comparatively few; but in cases where the two species of cuckoos—yellow-billed and black-billed—have joined issue, the number of instances is large. It is these occurrences, not rare, where there are five or six eggs taken from a nest, causing an amateur collector to think that one bird laid them all. By a student the eggs of the two species may be readily distinguished. One of our prominent ornithologists insists that in time the American cuckoo will have fully acquired the well-known habit now possessed by its European congener.

BUZZARDS, HAWKS AND EAGLES IN SOUTHERN CALIFORNIA.

By J. H. Morrow.

If one wants to be impressed with a sense of loneliness (did I say impressed?—oppressed would be better), he should ascend a foothill of Southern California, and, far above the plains and the habitations of man, become an object of interest to a circling flock of buzzards. The fact that he is on horseback, and that his wiry and intelligent pony every now and then turns its head around with an inquiring look in its troubled eyes, does not affect the situation. The presence of those dreadful, slow-moving birds, wheeling so near that their wickedly hungry little black eyes are plainly visible, strikes terror to the heart. And the thought comes: "How quickly would these creatures pounce upon me were I to be prostrated by sudden illness in this spot, remote from human aid."

Recently the writer had such an experience—all but the prostration—on one of the foothills back of Whittier, a little town a dozen miles from Los Angeles. The birds were to be numbered by the dozens, and kept up a noiseless, constant flight in circles, with the rider as a central point, that was an interesting study. With the instinct of their species they seemed to recognize the fact that in the barrenness and remoteness of the spot there was chance for mishap and for the harvest of death which their nature craved. Frequently they flew so near that the fanning of their great wings could almost be felt. But for their featherless necks and ugly heads they would have been objects to be admired, so graceful were their movements. No gulls in the Bay of San Francisco ever cleft the air more majestically than they. But as one gazed upon them the feeling was that of absolute repulsion, of undefined dread.

Still more recently, on a far-reaching plain or mesa, the writer again came upon a flock of these despicable but useful birds, for as scavengers they have a use so important that by the laws of the State they are protected from molestion. The spot was on the edge of a gulch through which ran a stream of water. Judging from the stench which filled the air, some animal was lying dead in the long grass a hundred yards from the roadside. There the buzzards were assembled, voraciously devouring their toothsome meal. As we rode up a number of them slowly rose from the ground and began circling about us. One old fellow with especially wicked eyes lazily winged his way to the top of a telegraph pole just ahead and perched there until we had ridden by, as though sizing us up and reckoning the chances of a fresh repast. When we had passed he indulged in a parting wheel above us and then rejoined his companions in their discussion of the bill of fare by the side of the gulch.

As a rule these buzzards of California fly singly. They are met with most frequently in uninhabited regions. Their "scent" for carrion is very acute, and one scarcely makes a "find" before companions begin arriving from every point of the compass.

In striking contrast to the buzzard is the hawk family. Hawks, from little fellows scarcely larger than pigeons to big fellows almost as large as eagles, are very common in California. But their business is with the living, not with the dead, and they awaken corresponding respect. They are very wary; to get within even shooting distance of them is difficult. On a ride between Puente and Pomona the writer came across several big ones, as well as many of the smaller species. The latter showed a bird-like fondness for telegraph poles and wires, though they would fly swiftly away as the traveler approached. The former were seldom at rest, but kept circling in the distance, now and then swooping down in pursuit of some small animal. Their hooked beaks made them look formidable when they could be approached closely enough to be seen, but there was a dignity about the birds that excited emotions of respect utterly wanting in the case of the buzzard.

Eagles are not abundant. Unless they are protected by statute, as they should be in every State, and as they are in Connecticut, they must soon become things of the past, or at least very rare in California. We saw recently in a glass case in a San Bernardino drug store, a very large and beautiful specimen of this species of bird. It was owned by a naturalist-taxidermist, and was referred to by the druggist as rare. Unless the American people are careful, this splendid bird will only be found in museums and on the "coin of the realm."

THE AQUARIUM.

CONDUCTED BY HUGO MULERTT.

[The Editor of this Department will cheerfully answer all queries relative to the conduct of Aquaria.]

The Sagittaria or Arrowhead.

In the great economy of Nature the sagittaria have contributed their full share to the support of the human family in all parts of the world. The Chinese and Japanese cultivate them very extensively for food, also the Tartar Kalmucks use them for food. Aquatic birds are fond of them, and resort to favorite spots in spring to feast upon the tubers, when the Indians slay the birds for their own feasts. The tubers are generally as large as hens' eggs, and are greatly relished when raw, but have a bitter, milky juice, not agreeable to civilized man; this is destroyed in boiling, however, and the roots are rendered sweet and palatable. They are considered excellent when cooked with meat, either salt or fresh. To collect the roots the Indians wade into the water and loosen them with their feet, when they float up and are gathered. They are of an oblong shape, in color whitish yellow, banded with four black rings (U. S. Agr. Rept., 1870). They serve as food for the Indians of Washington, under the name of Wappatoo. In shallow ponds and muddy margins of lakes and rivers throughout the Northwest this plant, so variable in foliage and so abundant in distribution, furnishes an important article of native food in the tubers which beset its fibrous roots. These tubers, from the fact of their affording nourishment to the larger aquatic fowls which congregate in such abundance about the Northwestern lakes, are called by the Chippewas Wab-er-i-pin-ig or swan potatoes, a name which has been naturally appropriated to several streams in that region. Wabesipinicon, meaning the abode of the swan potato (Owens' Survey of the N. W.).

From the foregoing extracts it will be seen how universally they have been employed to assist in the maintenance of the human family, and probably we know very little yet how extensively they have been employed in North America.

We have collected them from a great many localities in Ohio, Indiana and Illinois, and find in early spring a solid, brittle, tuberous corm, down deep in the earth, being the germ from which the plant starts in spring. From the corm, at the first approach of warm weather, starts a large, porous root-stock, reaching up to near the surface of the earth, and there throws out innumerable fibrous roots, which is the true crown from which spring the leaves, flowers and stolens, and is also the plant centre during summer. By the 1st of June the milky juice (starch or saccharine, etc.) has usually been absorbed by the new growth of the plant, and the corm is then a soft and flexible, or spongy mass, reminding one of a sprouted and growing potato, while by the middle of July or 1st of August we would not find any corm, but found decayed masses which we were reasonably certain were the remains of the former corms.

In addition to tuberous and fibrous roots, the sagittaria present the feature of producing *stolens* or long, creeping roots, just below the surface of the earth. They start from the stem, and usually from just above the fibrous roots, and creep out horizontally from the plant in all directions. We do not now recall a single genus of plants that present so many different forms of developent in each plant as the sagittaria. First, the roots are of three entirely distinct forms, the tuberous, fibrous and stoleniferous. Next, the leaves are sometimes phyllodia (submerged and riband-like), others are an elliptical, erect blade, upon a tall, round, or slightly angular stem, and lastly, the leaf developed into its true form—arrow-shaped. Again,

THE SAGITTARIA.

let us look at the flower; the lower ones are usually fertile, producing seed to perpetuate its kind, while the upper ones are sterile and barren, or each flower stock producing flowers with the sexes separate and still on the same stock.

The flowers are borne on long, leafless, branched stems, well above the foliage, with pure white petals and a yellow centre (stamens), usually single, but occasionally *S. sagittaefolia* and *S. variabilis*, var. *latifolia*, have been found growing wild with double flowers. European nurserymen offer these varieties now for sale.

Sagittaria natans and *S. lanciolata* soon became favorites

of American and European aquarists. For growing in an aquarium we find few plants better suited, and for a fountain, small lake or pond, it has few equals. In their natural condition they are found growing in soft, muddy or sandy ground, consequently the conditions for a successful cultivation must be continued, viz.: grown in soft, loamy soil, while, if for pot or tub culture, a layer of coarse sand or small pebbles in the bottom of the tub is always desirable for all kinds of aquatic plants; at the same time a layer of clean, fine sand, spread over the top of the soil, not only looks bright and cheerful, but very materially assists in purifying the water. Of course the tropical species will not withstand our winter, but must be protected the same as other tropical plants. but they can be allowed to remain in a neglected corner until required again for the lawn or show house. The *S. sinensis* is of very easy culture; it may be grown either way, in water, moss or soil. If treated like the Chinese narcissus—grown in a bowl of water—it makes a very graceful and attractive specimen within a few weeks after it is planted.

Two Practical Queries.

1. How long will fish live in a quart jar used for canning fruit, when the top is screwed on tight? Jar is made of glass. 2. Is there any way of keeping water in a tank 24x18x12 inches deep, running steadily, without introducing more water?

William F. Hyde.

1. How long fish can live in a given quantity of water depends: 1. On the genus to which the fish belongs; 2. on the size and age of the individual; 3. on the conditions under which the fish has been used to live; 4. on the temperature and location the vessel containing the water is placed in. For instance, a young shad, a young grayling or a young spoonfish will drown in a few minutes in a quart of water, even if the jar is left uncovered; a young trout, channel catfish or a darter would live for several hours, although very tender in this respect if they have lived, previous to their being thus "bottled," in a self-sustaining aquarium for about a month; while a young gar, a little dogfish or a paradise fish, if the bottle would be only three-fourths full of water, would live until killed by want of food, which may be in some cases six weeks or longer, provided, however, that no sun or artificial heat or frost affects the water.

2. There is a little aquarium fountain sold in Germany which answers this purpose. It is set in the centre of the aquarium, draws its supply from the aquarium and returns it. This fountain can be made, by changing the jet, to flow like a little stream, which in turn drives the wheel of a miniature water mill. The pump of the fountain is run by electricity.

Feeding the Fish.

Putting a whole or half sheet of prepared fish food in an aquarium, with the intention of giving the fish a week's ration at once, can be compared to placing enough fresh meat on a dinner table to last for the week. It will not only lose its value as food, but will also poison the water. Offer your fish food every day, and, if they don't seem to care for any, don't give them any. At any rate let no food remain in the aquarium; remove it at once if refused by the fish.

Snails for Aquariums.

The ramshorn snail (*Planorbis trivolvis*), next to tadpoles, we consider the best agent to remove the *too much* green algæ in an aquarium. All the Planorbis are fonder of the confervæ than of the larger plants, and are therefore excellent inhabitants for the fresh-water tank, whilst the Lymnæ, most of them, are too dainty to eat up the troublesome, minute plants, but will be sure to make away with your more tender plants, such as anacharis, etc.

NOTES AND QUERIES.

[Under this Department Heading queries relative to all branches of Natural History will be answered.]

The "Alma Perdita" Bird.

Alex Starbuck, of Cincinnati, has recently presented the Cuvier Club Museum with a collection of strange and gorgeously plumaged birds, from the dense forests of Guatemala, containing only species new to the collection. Rich green and golden trogons, blue and olive motmots, flashing humming birds and crimson tanagers are among them. And the first specimen of the curious *Playa cayena* (Linn.)—a weird bird, belonging to the cuckoo family. This is a bird as large as a dove, of a rich, glossy, maroon color. It ranges from Central America to Northern Brazil, and is called by the natives "Alma Perdita," or the "Lost Soul." One of Whittier's most beautiful pieces is founded on a tradition of these people to the effect that the lonely, unearthly nocturnal cry of this bird is not the scream of a bird, but of

> "The pained soul of some infidel
> Or cursed heretic that cries from hell."

This poem so interested the Emperor of Brazil that he translated it, very faithfully and poetically, into Portuguese, and sent an autograph copy to Whittier. It was also translated by Pedro Linz, a Brazilian poet, and published widely in South America. The Emperor also sent Mr. Whittier two fine stuffed specimens, which were stolen before they reached him, but afterward another pair were forwarded as skins, which were stuffed and exhibited in Boston, where these "Lost Souls" attracted much attention, and then were sent to Amesbury.—*Charles Dury.*

A Phenomenal Icicle.

[COMMUNICATED.]

"Curious winter phenomena we have here," remarked the St. Paulite to the visitor from St. Louis. "You notice that icicle up there on the cornice of that eight-story building? Should say it was ten feet long. Well, this very morning one just like that dropped as Sam Bones was passing, and the point struck him square on the top of the head. It went through him like a shot and pinned him to the sidewalk, bolt upright, as stiff as a statue."

"Kill him?"

"Hardly. As soon as the icicle melted he walked off all right enough. See?"

"An extraordinary escape, truly—perhaps an isolated case. But I should think he would be liable to take cold from the draught through the hole in his body?"

"Not at all! You see, the winter climate here is so dry that—"

"Bosh!"

A Few Notes.

There are little events happening in every one's life that partake of the nature of romance as well as novelty. And many of these little transpirancies (to coin a new word) are pleasant to the memory of the person, and their recital sometimes does good to others. One evening recently, while riding along the highway with a friend, a fine flock of quail was observed in a cornfield near the road. The birds were quite tame, and were leisurely moving along over the deep furrows. One Mr. Bob White, who seemed extra proud of himself, hopped up on a high point of earth and proposed to display himself. With body highly erect and head proudly elevated, Bob White presented a truly spirited scene, and I remember wishing I were an artist, so that I might have sketched the proud bird.

—

It has been a much-disputed question whether squirrels hibernate, also if they provide themselves nuts and other provisions to eat in winter time. My experience and observations warrant me in saying that the squirrels do neither. The only provision they make for the winter months is to conceal in the earth various kinds of nuts, which are unearthed when wanted. As to their hibernating, they

only remain housed up a day or two during the prevalence of a severe storm or excessive low temperature. Ofttimes the squirrels are forced to subsist upon such things as afford little nourishment—for instance, buds of the elm, hack-berries and the bark of twigs of various kinds of trees. The squirrel has to devote hours of patient labor in gaining the feast of oily kernels of a walnut.

—

Birds and small animals are more sensitive to atmospheric changes than people are. Here on a bright warm day in December the robins were hopping about in the grove, and the nuthatches were gliding up and down and around the trees in all directions, while the squirrels were extra lively. They all felt the coming of a cold wave, which arrived in good order late in the day.—*Jasper Blines in Sports Afield.*

Globular Lightning.

This is a rare phenomenon. The general description of the occurrence is, that a luminous ball is seen moving very slowly, not touching any object, and eventually breaking up with a violent explosion and the appearance of several flashes of ordinary lightning. It is reported that the occurrence described has lasted at least a couple of seconds. Ordinary lightning, as is well known, is quite practically instantaneous. The size of the ball on different occasions has varied from that of an orange to that of a large glass lamp globe, or even larger. Many physicists refuse to believe any accounts of this manifestation of the electrical discharge, but the reports of it are too numerous and circumstantial for us to consider them to be baseless, says *Longman's Magazine*, which is authority for the foregoing.

The Glaciers of Alaska.

Soon after leaving Wrangle the first Alaskan glacier is seen in the distance, writes Kate Field, looking like a frozen river emerging from the home of the clouds. The sea is glassy, and a procession of small bergs, broken away from the glacier, float silently toward the south. It is Nature's dead march to the sun, to melt in its burning kisses and to be transplanted into happy tears. Wild ducks fly past, and from his eyrie a bald-headed eagle surveys the scene, deeply, darkly, beautifully blue, apparently conscious that he is the symbol of the republic. There are glaciers and glaciers. In Switzerland a glacier is a vast bed of dirty air-holed ice that has fastened itself, like a cold porous plaster, to the side of an alp. Distance alone lends enchantment to the view. In Alaska a glacier is a wonderful torrent that seems to have suddenly frozen when about to plunge into the sea. Down and about mountains wind these snow-clad serpents; extending miles inland with as many arms, sometimes, as an octopus. Wonderfully picturesque is the Davidson Glacier, but more extended is the Muir Glacier, which marks the extreme northerly points of pleasure travel. Imagine a glacier three miles wide and three hundred feet high at its mouth. Think of Niagara Falls frozen stiff, add thirty-six feet to its height, and you have a slight idea of the terminus of Muir Glacier, in front of which your steamer anchors; picture a background of mountains 15,000 feet high, all snow-clad, and then imagine a gorgeous sun lighting up the ice crystals with rainbow coloring. The face of the glacier takes on the hue of aqua-marine, the hue of every bit of floating ice, big and little, that surrounds the steamer and makes navigation serious. These dazzling serpents move at the rate of sixty-four feet a day, tumbling headlong into the sea, and as it falls the ear is startled by sub-marine thunder, the echoes of which resound far and near. Down, down, down goes the berg, and woe to the boat in its way when it again rises to the surface.

Data for a Large Collection of Eggs.

I have often been struck with the make-shift arrangements for keeping data adopted by those who have collections of eggs, and it has seemed to me that a description of the manner in which those of the "J. P. N." collection are kept might be interesting.

At the present time this collection contains nearly 4,500 sets, and each set has a separate data. It was necessary to devise some plan by

which any one of those 4,500 data could be readily found and consulted, and, after much reflection and many experiments, the one described below was adopted.

On receiving a set of eggs the original data is copied on a small printed blank measuring 1.84x.87 inches. This has the words "No." (for number of species), "Date," "Collector," "Locality," "Set Mark," "Incubation," "No. in Set" and "Identity" printed on the upper side, with blank spaces left for filling in these particulars, while on the back are written the name of the species and details as to the nest. It has been found that this little blank affords ample space for making an exact copy of all the information given on ninety-nine data out of every hundred, and, by making the writing small, it can all be placed on it. This size was adopted to allow the blank to be placed in the smallest-sized pasteboard tray used in the collection.

It having been properly filled out and compared with the original data, the blank is then put in the bottom of the pasteboard tray or box selected to hold the set of eggs, underneath the strip of flat cotton used for its lining.

Some one will ask: "Why take all this trouble?" It is done to prevent any possible confusion of sets. Where a collection contains many series numbering over a hundred sets of one species, it is almost impossible to prevent the duplication of set marks, and this might lead to confusion; but, where a copy of the data is kept in the same tray with the eggs, it is impossible.

The original data are kept in wooden boxes, each of which measures twelve inches in length, eight and a half inches in width and four and a half inches in height. These are outside measurements. The boxes are made out of wood that is three-eighths of an inch thick, and are therefore somewhat smaller inside. They each have a lid with hinges.

The data are placed in them in an upright position—in fact, in just the same manner that the cards are arranged in drawers in the "card catalogue" of a library. This admits of their being easily run over until the desired one is found, when it can be readily taken out and examined.

All of the same species are kept together, and they are arranged according to the Ridgway nomenclature, as the eggs in this collection have never been rearranged in compliance with the A. O. U. numbers. (Life is too short to do that.) Thus all the data for sets of the wood thrush come first in box No. 1; then follow those of Wilson's thrush, and so on in regular numerical order.

All of the data for the wood thrush are arranged according to the numerical sequence of their set marks, thus: 1 4, 2-3, 3-4, 4-4, 5-3, etc. Occasionally a data will occur where the collector has been foolish enough to use letters instead of numbers, and these are kept in alphabetical order at the end of those having numbers for set marks, thus: a-4, b-3, c-4, etc.

To still further facilitate the finding of any particular species, tin strips, cut just the width and height of the boxes, are inserted between the data at every fifty numbers. Thus there is one between 50 and 51, another between 100 and 101, etc.

I claim for this method: (1) The impossibility of confusion arising from the mixing of sets; (2) convenience of reference, as a single data, or all of one species, can be quickly found and taken out of the box for consultation; (3) the preservation of the data in perfect condition without folding, as the box is wide enough to hold the largest, and, if the data be on an absurdly small piece of paper (as some are), it can be either pinned or pasted on a larger piece and put among its brethren which are of the proper size; (4) economy of space, as I keep nearly 4,500 data in three boxes of the size described above, and have plenty of room to spare.—"*J. P. N.*" *in the Ornithologist.*

The Turkey Buzzard.

The turkey vulture is deserving of our greatest praise and protection, for no other bird renders such valuable and immediate service as does the buzzard, writes C. E. Please in the *Collectors' Monthly.* Other birds destroy insects which may injure our crops, they also destroy those which do no harm as well as those which are a benefit to us, besides charging "toll" from the crop itself. We can live without gay plumage, we can live without their

song, but when we come to consider health as a factor of our existence we must not fail to vote the vulture as our most valuable bird. The turkey vulture is more attentive to its duties than the other species, but its great numbers, vast region of extent and its seeming fearlessness enable it to secure the greater portion of food, and not even the dead rat in the barnyard is allowed to escape notice. Its God-given powers enable it to subsist upon that which is not only noxious to our external senses, but is poison and disease to our systems.

Endowed with the keenest scent and the sharpest eye, the buzzard is ever ready and anxious to remove the decaying carcasses from the fields.

We cannot comprehend their value to us, but we do know that theirs is a welcome mission, which promotes our better health, and health means wealth and happiness.

The buzzard it the most widely distributed of any of the family, and perhaps also the most numerous of any of our birds. Its range extends over the whole of the United States, Southern Canada, Mexico, Central America and the greater part of South America. It is most abundant in the warmer portion of the continent—the farther south one goes the greater the need—and there they are found soaring by hundreds, in company with their near relatives, the black vulture, or carrion crow. The two are often mistaken for each other, though a second look is sufficient to determine their difference. The buzzard is of a dirty brown color, with long, bent wings and divergent quills at the ends, and takes two or three long sweeping strokes of the wings, while the carrion crow is black, has short, straight, round-ended wings and flies heavily, making about six short, quick strokes in rapid succession, and repeated often, whereas the buzzard may sail for hours with perhaps only now and then a single wave of the wings. When seen closer the buzzard has a red head and a neck similar to a common turkey's, hence the name.

When anywhere but in the sky overhead the buzzard seems to be out of his realm, away from home. He is awkward, clumsy, filthy and unsightly. But let him stretch his powerful wings out over the fields and he at once becomes the most graceful bird of the air, sailing and rocking, as it were, on the billows of the sky. Other birds (such as the hawks), feeling a sense of pride, mount into the heavens to try their skill at soaring, but fall far short of the buzzard's standard of excellence, and presently drop into the forests below.

The very nature of the buzzard's occupation, or manner of subsistence, often requires him to go hungry (for he is loath to kill), and, consequently, when he does find food, gorges himself until unable to fly. If disturbed he will disgorge his meal to make safe his escape. I have no authentic record of one ever attacking a live animal, though they sometimes hover over a dying beast until life is extinct rather than eat the flesh of a living being.

Like other American vultures he has no voice, but only hisses like a goose or setting turkey.

The muscles of the wings, like those of most other sailing birds, are so arranged that when the wings are spread it requires no effort on the part of the bird to keep them thus, and it can soar all day without tiring. Its extreme lightness also aids much to easy flight, its body being even smaller than that of the carrion crow.

It often breeds in communities, but more commonly in pairs, selecting as a building site some rocky cliff, hollow log or stump, a cavity in a tree, a cave or even the bare ground. In trees the eggs are deposited on the bottom, even if it be hollow clear to the ground. Considerable noise is occasioned in going in and out by the wings raking against the sides of the tree, and is sometimes heard for nearly half a mile. For three seasons I have visited what is known here as "Buzzards' Cave," in hopes of securing a set of eggs of a pair that usually breed there. I finally concluded that they knew my errand, and quit going so regularly. One day as I strolled by I saw two full-fledged young sitting in the entrance sunning. On my appearance they turned and scampered to its remotest ends and tucked their heads in crevices of the rocks. This year I was rewarded for my patience by a handsomely marked set of two eggs, which further testify to the theory

that the eggs are laid in pairs that will hatch male and female; that the two are not the same general shape or of the same general markings. One is a "rooster egg," not laid by the rooster, but will hatch out to be one, and is longer than the other, and has a predominance of the dark brown markings, aggregated near the larger end; while the "hen egg" is shorter, more pointed, has fewer brown blotches and more of the concealed or lilac color, and more evenly distributed over the whole egg.

Now I will not vouch for the truth in this part of my letter, but it is my candid opinion, and as far as my experience goes the rule holds good. I would be glad to hear from other observers on this point.

The young of the buzzard, and also the "squabs" of the carrion crow, are pure white in the down, not a dingy yellow, but as clean looking as the driven snow. It is interesting to watch them as they grow, and the black quills appearing one by one in rows, till the beautiful down has disappeared and our squab is a ragged, dingy buzzard. It is several months before the young leave the nest. They are loath to be intruded upon, and emit the already decayed carrion in self-defense, and to the disgust of the intruders.

Two eggs generally constitute a clutch, and are too well described in books to need mention here.

Wood's Natural History gives a very good description of this bird.

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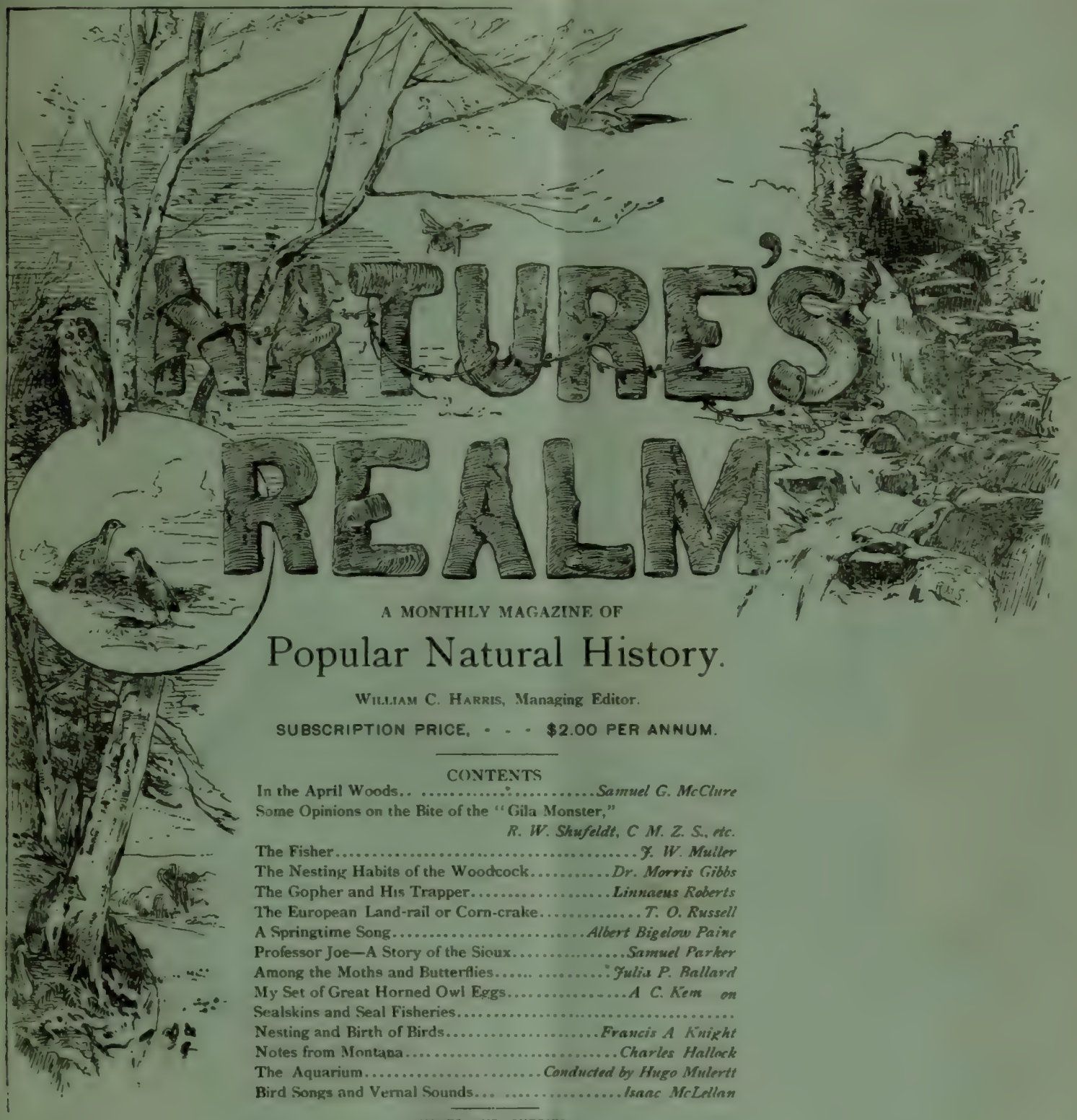
VOL. II., No. 4. APRIL, 1891. PRICE 20 CENTS.

[Entered as second-class matter in the New York Post Office.]



NATURE'S REALM

A MONTHLY MAGAZINE OF

Popular Natural History.

WILLIAM C. HARRIS, Managing Editor.

SUBSCRIPTION PRICE, - - - $2.00 PER ANNUM.

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PUBLISHED BY

THE HARRIS PUBLISHING CO.,

10 WARREN ST., NEW YORK.

J. KLINE EMMET, JR., Pres't. H. R. HARRIS, Sec'y and Treas.

NATURE'S REALM.

VOL. II. APRIL, 1891. NO. 4.

IN THE APRIL WOODS.

BY SAMUEL G. MCCLURE.

To most persons the woods are much less attractive in April than later in the spring or early in the summer. The ground is damp and the chill of winter yet lingers in the wind. The charm of foliage and flower that glorifies June is lacking, and it is yet too early for all those delicate shadings of color in the young leaves, those varying tints of green and pink that in a few weeks will freshen and beautify the now bare branches. The casual rambler misses the play of light and shadow through the summer leaves, and is apt to think the woods almost as deserted and cheerless as in January.

But to one who knows some of the secrets of these early days there is entertainment and pleasure of a rare kind in the April woods. The sharp wind may chill and yet seem only a sauce to give relish to the pleasures of a ramble. The student of Nature finds abundant compensation for all discomforts in the surprises that meet him, in the suggestions that come from every bud and half-blown blossom. On every side are beginnings and growth, and in watching them is a delight as keen as any a ramble later in the season can give. The unfolding of the leaf bud of any common shrub has in it a mystery deep as life itself, and may well suggest "thoughts that do often lie too deep for tears." The faint buzz of the bees in the maple tops that may be heard early in the month, or more commonly in March, and the whisperings of the budding branches in the spring wind, seemingly in a gentler and more confiding tone than when stirred by the sharper airs of winter, is a music as acceptable as any that ever rises from "God's first temples." By an upland brook or spring may be found the pussy willows shaking their full-blown, yellowish catkins in the wind, and the true lover of the woods will not fail to gather a handful of them and browse over them and revel in the subtle, woodsy fragrance that adds so greatly to their charm.

Everywhere leaf buds are bursting and tiny shoots, so delicately green, are pushing forth. The scales that bound them in and protected them have been pushed aside and are becoming dry and dead. Their work is done. Presently they will be loosening in the wind and sifting down on the dead leaves, falling into nothingness with last year's foliage. Even in spring the story of Nature's completeness, as well as her inexorable law of progress and the survival of the useful, finds expression in her acts, and is repeated in some form day after day. What a study the simple unfolding of a bunch of leaves is? Pluck a twig from the maple or elm or beech, and note the tufty beauty of the early shoots, the difference between their manners of opening, and the wondrous way in which all the form and fashion of those leaves were packed in that one swelling leaf bud only a week ago! Of all the many mysteries about us few are greater than the germination of a bud in spring time. What forces unite to push forth the leaf and fashion the flower? Whence comes the vital principle that controls it all? What unfathomed secrets of life are hidden in the shaggy tree trunks by which one takes on the foliage of an elm and the other of an oak each spring? Unanswered questions deep as life!

The young elm leaves show the serratio

and roughness even now, and the edgings of the beech leaves are delicate in their newness. The promise of harshness is already plainly written on the elm leaves, like elements of character easily read in a child, and maturity will presently give them the rasping stiffness of midsummer. The end leaves are mere coils of green, so tender that they cannot be untwisted without injury, yet in a few days at most Mother Nature's touch will have unwound them easily and naturally.

Notwithstanding chilly winds and drifting clouds and frequent dashes of rain, Nature is unusually busy these days, though less seems to be accomplished than in a like time later in the spring. But that more rapid development is made possible only by the preparation now. The month is one of beginnings and promise, and nowhere will one feel this more than in a walk through the woods. Here, there and everywhere the tender green is peeping forth from under dead leaves as well as from branches erstwhile bare. As one notes the activity of each tree and herb, he almost imagines he hears a bustle of preparation, and the hurry and excitement of those anxious first attempts; but, save now and then the snap of a bursting bud, so low that one must needs have sharp ears indeed to hear it, the plants and trees seem to do their work in silence. However, it is doubtless only seeming. Were our ears sharper and our sense of sound more delicate, we might hear a hundred sounds of busy life and bustling rivalry in these April woods that now fall unnoticed on the air.

Nature is always full of surprises, but rarely more so than on an April day. One goes expecting much in an indefinite way, and he is to be pitied who is so unfortunate as to find less than he expected. Usually it is quite the reverse. Surprises crowd in at every step. Even the old rambler, familiar with Nature's ways and habits, will meet unexpected things at every turn, and if the occasional visitor to the woods does not, it is usually because his powers of observation are not sufficiently developed, for one must watch closely if he would see half the subtle workings of Nature in the April woods. What genuine pleasure there is in an unexpected find! Perhaps it may be only a bunch of wild phlox a week earlier than its sisters and cousins and slightly pale under the gray skies but as sweetly fragrant as ever, or a new phase of activity hitherto unnoticed, or some little puzzle worked out in wondrous simple fashion right before his eyes. A peep under the dead leaves is never unrewarded. Beneath that moist, warm coverlet, charming transformations are always going on. A winged maple seed has found a lodgment there, and with wings still strong but useless, has put out rootlets and started a single sprout upward. Or some crisp white stem of a misguided trillium will be found lifting the leaves by main force in its struggle to reach the light. Where the bed of leaves is thinner flower buds are starting that in a month, or possibly in a few days, for hours often work wonders with spring flowers, will begin to open and make the joy of Nature complete in full bloom.

The spring beauty (*Claytonia virginica*), with its pink and white, is lighting up the rooty banks and grassy plots everywhere. It is always a surprise to me that this flower should so greatly exceed all others in number in the early spring time. For days, sometimes for weeks, in the localities with which I am most familiar (Ohio), it is almost without rivals. What talisman does it possess that enables it to so outnumber and outshine all others in these April woods? Doubtless the small, deep tuber from which it springs, in part explains its abundance, but why it should be more common than toothwort (*Dentaria laciniata*), hepatica (*H. triloba*), early crowfoot (*Ranunculus fasciculus*) or marsh marigold (*Caltha palustris*), all of which have root stocks, is hard to discover. Hepatica is the only one of those named that approaches rivalry, and it only in choice localities. Later the many varieties of violet equal it in abundance, but, as they outnumber it in species ten to one, they ought to do so. In the April woods, however, it is only in forward seasons that the spring beauty does not exceed all other flowers in number. Its very abundance makes it less esteemed, it seems to me, though its pink cheer adds a brightness to the landscape that greatly enhances the beauty of the woods in these gray and brooding days.

It is still early for violets, though the leaf pads pave many a forest corner, and by the middle of the month the short-stemmed yellow ones, with their purplish eye so suggestive of the pansy and possibly its original type, are to be found in abundance in many localities. By May the blue ones will be blooming in all their purple beauty on every hill and in every valley. Few flowers are so universally popular as the violet, and fewer still have so long held the admiration and love of men. It is as common in Europe as here, and so popular that in France it became the flower of the Napoleons. Even in the early days of Greek mythology, 2,500 years and more ago, it was a favorite with gods and men. Violets were created by Zeus for Io, it was said, and they formed the couch of Zeus and Hera. Truly we have royal precedent for lolling in the violet beds on a May day! Unlike the spring beauty, the abundance of violets in May seems to make them dearer to us. Every one knows the modest and beautiful blossom, and to every one, from the country boy who busies himself in the sacrilegious sport of seeing which "Johnny-jump-up" will jerk the heads off the largest number of others, to the city belle who dreamily bends over a vase of the purple blossoms and thinks of the triumphs of her last party, it is a prime favorite. Other wild flowers of spring time are beautiful and win ardent admirers, but none generally found the country over possesses all the elements of permanent popularity to so full a degree as the

> "Violets dim,
> Yet sweeter than the lids of Juno's eyes
> Or Cytherea's breath."

The wood anemone is another blossom of these April woods that charms all who know it. The much admired hepatica is its own sister, though the anemone is the frailer of the two. It is unrivalled among spring flowers in the delicacy of its shadings of color. It seems to have caught those rare first blushings in pinks and purples that make the early dawn of a bright spring morning an inexpressible painter's dream. Such a dawn is glory by suggestion, and the wind-flower seems to have awakened just in time to catch and fix those rich and delicate tints and assume its own loveliness, while suggesting in the variety of color the bursts of summer bloom. Its blossoms, which the old legend poetically but untruthfully declares are only opened by the wind, hence its name, vary in color even more than the spring beauty. In a cloudy spring the tints are darker, while in a period of sunshiny days they become brighter and more brilliant. They range from almost pure white to rich, delicate purple, and always with a delicacy of shading and a harmony of color that is a delight. In May there will be many of them, and we can gather the frail blossoms that seem to shrink from the touch and wither so soon, and admire them to the full, for none of the later flowers surpass them in beauty; but never is its charm so great as in that happy hour when one comes half unexpectedly upon the first anemone of the season. Then is it loveliest. Capping its hairy stem in simple modesty, its beauties often withheld from even the watchful eyes of its admirer, the wanderer in the April woods will be abundantly repaid if he find but one of these frail blossoms purple-tinted by the unrivalled pencil of Nature, or blushing pink and white in confusion at the touch of even an admiring friend.

Then there is the dandelion. Who does not welcome it as it blooms in the open glade? And the white blossom of the blood-root (*Sanguinaria canadensis*), and the glory of wake-robin, the white trillium, that opens its single blossom to the sky so confidingly and seems gazing upward watching perchance for the northward flight of the later migratory birds. The trillium comes like a promise of peace, and when, as sometimes happens, the season is forward enough, makes one of the loveliest of Easter flowers. Then there is the low stalk of the early crowfoot (*Ranunculus fascicularis*) with its bright yellow flowers gladdening the rocky hillsides, and perhaps not far from it may be found the small white blossoms of the saxifrage (*S. virginiensis*) rising on their clustered cyme five inches or more above the pad of thickish leaves and breathing out their faint sweetish fragrance. Down in the rich soil by the little brook are blooming the pale purple, or sometimes whitish, flowers of the toothwort (*Dentaria laciniata*), the clus-

tered flowers suggesting St. Andrew's cross in shape, and if the rambler will take the trouble to dig an inch or two into the moist soil below them he will find a group of little tubers whose pleasant taste touches his tongue with the pungent joy of spring. In the swampy place near by are the broad leaves of the marsh marigold (*Caltha palustris*), often incorrectly called the cowslip, and above the heart-shaped shields rise the golden flowers.

In a sheltered open where the wind does not reach and the sunshine falls in a fitful burst, the rambler can pause and listen. Far away, high among the bare branches of a knot of oaks, a pair of crows are cawing, laying plans doubtless for the summer. In a cluster of beeches a squad of blue jays are mustering noisily. From some nearer sunny nook close by its nesting place come the sweetest notes of spring, the bluebird's song. The cheery tones of the robin ring out not far away, and with that most beloved of our bird songs, memory draws again the pictures of cherry trees snowy with blossom and a peach orchard pink with bloom, and there comes a flood of associations clustering around a boyhood country home.

SOME OPINIONS ON THE BITE OF THE "GILA MONSTER" (*Heloderma suspectum*).

By R. W. Shufeldt, C. M. Z. S., Etc.

While residing in New Mexico a few years ago the writer paid some considerable attention to the life-history and structure of that biggest of all our lizards, the "Gila monster," more properly referred to as the *Heloderma*. For a year or two at a time I had them alive in my keeping and under my daily observation, and I case it is believed that the figures here presented will meet with acceptance in many quarters. They are faithful reproductions of photographs made by the author from living specimens once in his own possession. The life-size left lateral view of the head is from a female, taken as she lay in an hypnotized state

Fig. 1.—Left Lateral View of the Head of a Heloderma—Life Size.

once had a large one that possessed a length of 41.3 cms., and a smaller one of rather more than half that size. They have occasionally been taken nearly 51 cms., or about twenty inches long. To the general reader the coloration and form of this remarkable lizard is as yet but imperfectly known, especially in the far eastern sections of our country, where it still remains one of the scarcer acquisitions to the larger zoölogical gardens. This being the over a roughish piece of pine bark; the two others, shown in the second cut, were photographed as they lay basking out in the sun in the rear courtyard of my quarters in New Mexico. The larger one of these latter two is the same from which the figure of the above head was taken. Helodermas have a tuberculated armor of black and orange scales, brilliant and shiny, that vary both in size and form for different parts of the body. On the head

and elsewhere these often ossify in adult specimens, thus enhancing their purpose as a means of defense.

But to come strictly within our title it is my only object here to briefly remark upon some of the opinions entertained in reference to the bite of this lizard. Now there are a great many people in Arizona, where *Heloderma suspectum* is found, and still more in Old Mexico, where its congener, *H. horridum*, ranges, that believe that the very breath of one of these reptiles breathed in a person's face may prove to be poisonous, and as regards the bite there is but one opinion among this class of folk, and that is that it is almost invariably fatal. No less a well-known naturalist than Sinnichrast gives instances, citing the reports of Mexicans, where fowls and small mammals bitten by a *Heloderma* have died within a few hours; but his own experiments did not confirm them. While in London Sir John Lubbock, a most careful observer and naturalist, declares that he saw a frog die in a few moments from the bite of a lizard of this species which had been sent to him. A number of years ago the present writer was bitten by a large and infuriated *Heloderma*, but aside from some serious and painful symptoms at the time, and a swelling of the hand bitten, no permanent effects remained. Thus the bite and the results following the same came gradually under the investigation of science. In 1883 two distinguished physicians, Mitchell and Reichert, of Philadelphia, published an admirable report upon the subject, and declared, from a careful series of experiments they had made with the saliva of living *Helodermas*, that there was no doubt whatever of its highly venomous nature, and the dictum of those so authoritative in such matters carried great weight everywhere.

The tide of opinion changed somewhat, however, when three years later Dr. H. C. Yarrow made some very excellent experiments at the Smithsonian Institution, and published his results in *Forest and Stream* (New York, June 14, 1888). His researches practically went to prove that in the case of chickens and rabbits, at least, the saliva absorbed copiously by them from the bite of an angry *Heloderma* was harmless. Still later, Professor Samuel Garman, of Harvard University, published it as his opinion that "in regard to the nature of the vemon and fatality of the bite (of a *Heloderma*) there is little to offer that is new. The results of the experiments suggest danger for small animals but little or none for larger ones. Large angle worms and insects seemed to die much more quickly when bitten than when cut to pieces with the scissors." Thus the matter seems to stand at the present time—perhaps the vast majority of physicians who followed Doctors Mitchell and Reichert in their experiments fully believe to-day that the bite of a "Gila monster" will very often prove fatal even in the case of man; while, on the other hand, naturalists almost universally believe that the saliva of this saurian is hardly at all venomous, and then only under certain conditions. The subject will repay fuller investigation and research. There are also several questions to be carefully taken into consideration in future experiments and observations. In the first place, in the case of man, the condition of the victim at the *time of the bite* must be carefully recorded, and then one must be sure afterward that the patient, in the event of death, was not destroyed by the remedies given to offset the effects of the bite. As, for instance, a quart o whiskey or other strong alcoholic liquor will often, of itself, kill a man outright. Again, when a *Heloderma* bites a pigeon, a chicken, rabbit or cat, does it *invariably* inject the wound with the supposed-to-be poisonous saliva? In connection with this it must be remembered that this reptile often in nature catches and eats small mammals and birds, and it is just possible that he kills them by the wound inflicted by the bite alone, and injects nothing thereinto. This may be the case in some of the animals he has bitten in the hands of experimenters. A reptile may have sufficient control over a poison gland situated beneath its jaws as *not* to call its secretion into use every time he bites. He may possess an innocuous *buccal* secretion *in addition* to the poisonous secretion of the submaxillary gland. In view of this possibility, it is an open question, owing to the different methods employed to obtain it, whether Doctors Mitchell and Reichert and Doctor Yarrow obtained the

FIG. 2.—THE "GILA MONSTER" AS HE APPEARS IN HIS NATURAL HAUNTS.

same kind of saliva; and it must be noted that the various steps in their experiments were essentially very different indeed. In the case of Sir John Lubbock's frog, it is also possible that the tooth or teeth of the *Heloderma* may have punctured one of the large arteries, a thing quite possible in the case of a small frog, but rather improbable in the case of a cat or even a chicken. Indeed, it must be very evident that there are yet to be made many experiments in this extremely interesting field before the exact facts can be known in the premises.

[In connection with the above interesting paper we append observations on the "Gila monster" made by Dr. R. W. Shufeldt, and published in the Proceedings of Zoölogical Society, of London, April 1, 1890. It is to be regretted that no exhaustive notes exist as to the life history of the *Heloderma*. The subject is, however, attracting much attention among naturalists, and a full biological history of the animal will doubtless follow at an early date. —ED.]

During the summer of 1887 the present writer came into possession of two very fine living specimens of *Heloderma suspectum* that had been obtained for him in Southern Arizona, in that section of the United States zoogeographically known as the Sonoran Region, and where the natural habitat of this, by far the largest of all of our North American lizards, is located.

Never having been so fortunate as to have enjoyed the opportunity of studying the habits and life of the Heloderma in its native haunts, I can add nothing here to the accounts of others already published; nor am I familiar with the mode of reproduction in this interesting species of lizard, though I have heard it stated, by good observers, that it is an oviparous reptile. The two living specimens above referred to were separately packed each in a small box, and in coming to me arrived in excellent condition, after making a journey of several hundred miles, lasting six or eight days, and each lizard consuming only on the day of starting part of a boiled egg. Upon being removed from their boxes they drank freely of water, and afterward each ate the best part of a hard-boiled hen's egg. Both of these acts, however, were performed with marked deliberation, so much so that one would little have suspected that the creatures were in any way particularly hungry. In eating they employ their broad, black, forked tongue to a considerable extent, protruding the organ slowly from the mouth, spreading it out, and licking the morsel well before it is taken into the mouth and swallowed. They may also, in drinking, occasionally be seen to lap the fluid with this organ, and still in a more or less deliberate manner. These two specimens have already been several months in my keeping and under my daily observation, during which time they have not eaten half a dozen hen's eggs between them, sometimes taking them hard-boiled, but as a rule seeming to prefer them raw; they have refused all other nutriment which has been placed before them.

I have shown elsewhere that another American lizard, *Phrynosoma*, is capable of enduring an absolute fast for a period of three months or more (*Science*, vol. vi. no. 135, September 4, 1885, pp. 185-186); and it is a well-known fact that other reptiles can do likewise. Moreover I am quite sure, from what I have seen, that a good healthy adult *Heloderma* would prove to be another representative in this category, capable of sustaining a prolonged period without taking any nutriment whatever into its system.

When one of these reptiles is placed on the open ground and left to itself it soon takes itself off, and notwithstanding its rather awkward mode of progression makes withal very good time. Head, body and tail are all kept in contact with the ground, while the alternate fore and hind limbs are thrown forward as the animal takes its rather ample steps and keeps its way along, with no other apparent motive in its mind beyond making good its escape. In walking thus it constantly protrudes, and again whips back into its mouth its great black tongue, evidently to some degree using the organ as a detector of anything that may possibly stand in the road to impede its progress.

If you now suddenly check it, the animal quickly rears its body from the ground by straightening out its limbs, wheels about, opens its mouth widely, snaps its tongue in and out,

and gives vent to a threatening blowing sound. The whole aspect of the reptile, taking its great size into consideration, is now quite sufficient to keep the best of us at bay at first, and the moment it is let alone it takes the opportunity to make off again, usually in another direction.

My two specimens seem to be quite attached to each other, and are never so well satisfied as when curled up together in a sunny corner of their cage; I am unable from their external characters to determine their sex, and this will only be possible later on, when we come to examine into their structure.

These lizards are, too, very fond of basking in the hottest of noonday suns, and I have satisfied myself that upon these and other occasions, when I have closely watched them, they possess to a certain extent chameleonic powers, for I have observed the orange part of their scaly armor pass from that color to a decided salmon tint and *vice versa*, remaining normally, however, at some shade of orange or yellow. When thus sunning themselves they have a habit of stretching their limbs backward, even to the extent of having the feet with their dorsal aspects in contact with the ground, the palms and soles being directed upward. They will then close their eyes and lay in this position for hours at a time. So far as their physical strength is concerned, it seems to be about equal to that of young alligators of a corresponding size; they do not, however, possess the power of striking a blow with the tail, enjoyed by the latter reptile. And in getting over rough ground, where branches, large stones, or other obstacles stand in the way, Heloderms evince no little patience, ingenuity, and downright obstinacy in overcoming such barriers to their progress. By a series of simple experiments I have been enabled to satisfy myself that the senses of sight, smell and hearing are all quite acute in these reptiles, and they are also sensitive to the sense of touch. As to their general intelligence, however, or such mental attributes as they may be possessed of, I have made no special investigations, but from my casual observations I am inclined to believe that they stand rather above the average reptile in both of these respects.

* * * * *

THE FISHER.

By J. W. Muller.

With gentle feet and peaceful heart
  He goeth by still ways;
The world's ambitions lure him not
  From many streams and bays;
He holds gold cheap to whom God sends
  The wealth of quiet days.

He wandereth where silent groves
  Stand dark on silent shores;
Where specks of straying sunlight fall
  Slow splash his lazy oars,
And woodland breezes bear to him
  Sweet gifts from Nature's stores.

Grandly from out the eastern sea,
  With white cloud sails unfurled,
He sees the mighty fleet of day
  Steal on a sleeping world,
While from the strand deep broadsides boom,
  Where the white surf is hurled.

Where all the world's loud noise is hushed,
  And only breezes sigh,
Where peacefully and aimlessly
  The white clouds sail the sky,
There dreameth he, and on the world
  Looks with a placid eye.

To him, his evening comes where winds
  Blow soft on reeded shore,
Where softly like a requiem sounds
  The distant ocean's roar,
While on his sleep the silent stars
  Look down forever more.

THE NESTING HABITS OF THE WOODCOCK.

By Dr. Morris Gibbs.

The American woodcock (*Philohela minor*, Gmel.) is recorded as a bird of Eastern North America, north to British provinces, west to Dakota, Nebraska, Kansas, etc., breeding throughout its range. In my acquaintance of nearly a quarter of a century with this pleasing species many nests have been discovered, and it has occurred to me to write a partial description of the very interesting nesting habits.

In lower Michigan, approximating latitude 42° north, the long-bills arrive about April 15 in numbers, although many are often seen in March, and they have even been recorded in late February. About the middle of April the mating season is inaugurated, although I have nearly satisfied myself that the majority of the birds are mated on their arrival from the south. Those late nestings are the isolated cases where difficulty was experienced in mating by young cocks, or more likely where the first eggs were destroyed, necessitating a second attempt.

It is during the mating season when the song of the woodcock is usually heard; in fact, I have never heard it later than July 1, though information as to its being heard in the autumn months is occasionally adduced. This song, so called, is composed of a single note, and is difficult to describe; it is uttered nearly always when the bird is flying and undisturbed, and may be called its love note. It is rarely heard, unless one is an observer and seeks the haunts of the long-bill at twilight's hour. Though so simple it is never uttered often enough to be considered monotonous, and it is to all intents its love song, and undoubtedly answers every purpose as well as the more melodious and varied carol of the thrush. To me it is ever exhilarating and pleasing, for I am led to an agreeable train of thoughts thereby; we may well believe, too, that there is a curious little brown hen listening to the notes as the active fellow dashes about in the gathering gloom near the willow copse, where the mate is patiently awaiting the return of her lord.

Mating having taken place after much flurry, in which the success of the favored male seems gained from his attempts at gyrating flight, as battles are not seen to occur, a nesting site is chosen. The point decided on is always, so far as my experience goes, near bushes or trees where some protection is afforded, but the trees may be absent in many cases, and the bushes may be very scanty and scattered. The spot where the eggs are laid is always free and open, and though the nest be placed near thick bushes and beneath an almost impenetrable growth of branches, as it sometimes is, it is always in perfectly open sight. It is fair to say that the nest is nothing, in four cases out of five the eggs being laid on the bare leaves in a small natural depression in the earth, but in many instances there is evidence of some attention on the old birds' part, and in two cases which I have met with there was proof of quite an amount of skill displayed. One of these nests was all of two inches high at the edge, and formed nicely and evenly; it was composed entirely of dead leaves of the previous year. The other nest was composed of small twigs and lined with grass, and was placed between small weed stalks, which supported the sides.

In the woods, where the sun's rays cannot strike, or only faintly at best, and where the spring rains have soaked the low ground, which they always select, the surface is nearly always wet, and consequently the eggs are nearly always found on the wet leaves or grass.

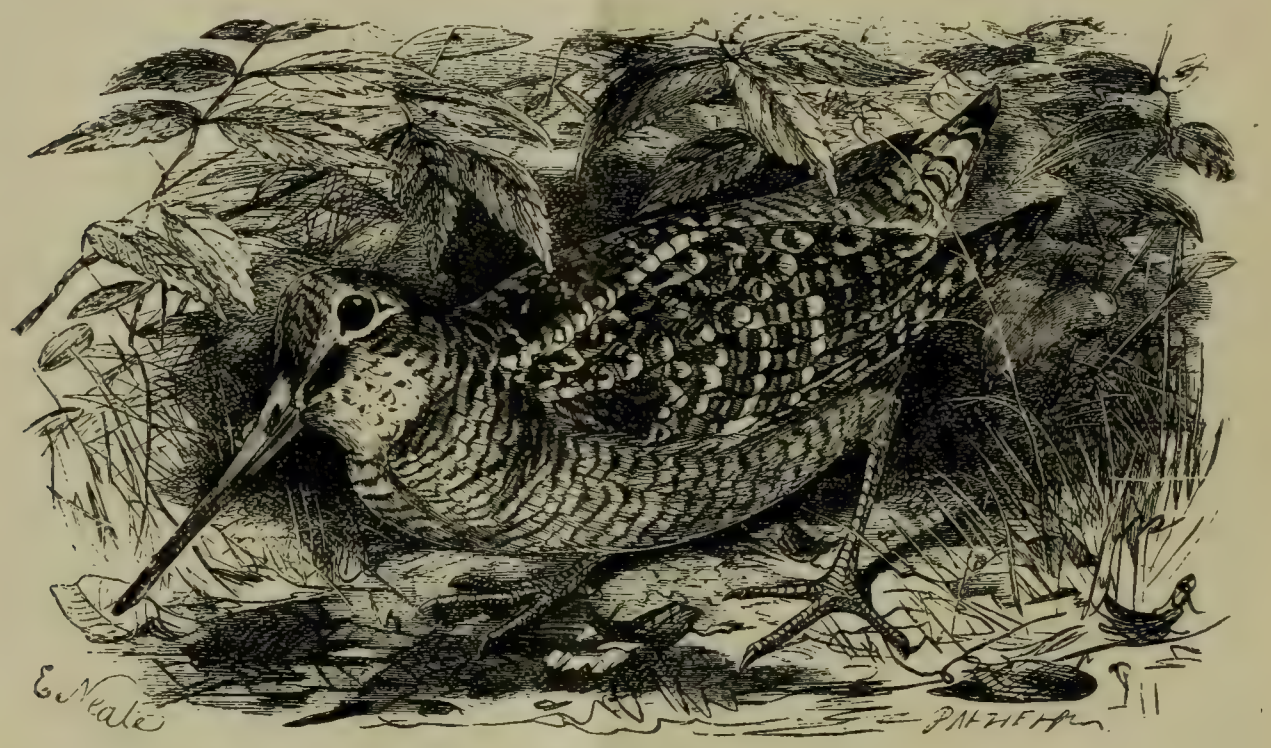
The eggs are generally laid in late April or early May in Southern Michigan, but are deposited by the last of March further south. Well-grown young once met my notice May 20, which would indicate that the eggs were laid in early April. There are many late nestings also, and I am satisfied that many young are hatched in July. At one time we had a ridiculous law which opened the season for woodcock July 5; when hunting at that date one season I found a brood of young but a few days old. The eggs are four in number, of a creamy or buff color, irregularly and thickly spotted

with pale reddish brown of varying shades. In shape the eggs are rotund, and less pyriform than those of the snipe and other small waders; they average in size 1.59x1.22 inches.

After the eggs are hatched what strange occupants we find in the hollow! what queer masqueraders are taking the place of the handsome eggs! The young—for young woodcock they are—are remarkable creatures, and are recognized by their bills, which are their only claims to a likeness to their parents. They are pretty at first as to markings, of blending siennas, bone and caledonian browns, although grotesque in the extreme. After a few days of nursery life they shake the dust, or, more properly, muck, from their feet and leave the so-called nest, and wander about and in and out among the weeds and grasses. They tumble around as do young snipe, and in many respects much resemble those young chicks in appearance. At first they are clothed with a filmy down, which in time gives way to pin-feathers, and a full month elapses ere the young are of an age to fly and care for themselves.

When discovered they may be seen resting themselves, in the manner of the old one when on the nest, or seeming to, on their bills, when undisturbed, but when molested they will attempt to scuttle off to cover. In this they are in no wise as expert as young quail or grouse; however, if one will draw away from the scene and return later, it will be found that the old bird has effectually concealed her brood.

Woodcock are great destroyers of worms and grubs, and should statistics be given as to the amount of this kind of food devoured by this bird, I am afraid that I should not be believed. If we are to credit Audubon, that accurate observer and celebrated ornithologist, the woodcock will devour as many worms in a single night as will equal its own weight. On coming to a tempting bit of ground they plunge their bills rapidly into the soft earth in an apparently aimless manner, but visibly by an astonishing correctness to the worms constituting their food, and which they pull to the surface and devour with great gusto.



THE WOODCOCK.

When a boy, nothing exceeded the pleasure of a stroll by the river and search for the woodcock's nest, and those days spent in the study of their habits were indeed red-letter days to me, and are still pleasing recollections, and only surpassed by recalling early October hunts in pursuit of the whistling wings.

THE GOPHER AND HIS TRAPPER.

By Linnaeus Roberts.

How many readers of NATURE'S REALM, I wonder, are acquainted with the gopher? Not the little ground squirrel found in some of the Northwestern States, nor the land tortoise of the South, which both answer to the name. This fellow is the pouched rodent, whose havocs in Iowa, Missouri and other States along the Mississippi River have annoyed farmers more than all other nuisances combined.

His book name is *Geomys bursarias*, but I very much doubt if the boy who traps him could recognize him by such a classic title, and it is certain that Mr. Gopher himself would never come at the call. At home he is just plain *gopher*.

A full-grown gopher is about the size of a large rat. The body is covered with a fine reddish fur. It tapers from the heavy shoulders back to the root of the tail. The fore feet, broad and spade-like, and armed with immense claws, seem altogether out of proportion to the other parts of the body. But when the amount of work they are expected to do is taken into consideration, they seem wisely adapted to their owner's needs.

The two pockets, one on each side of the neck, are the most distinctive feature of this little animal. These are two inches deep and an inch in diameter. It is generally supposed that they are receptacles for food, although knowing ones assert that they are also used for carrying loose earth out of the burrow. However authorities may disagree as to their uses, it is certain that no gopher was ever seen with his hands in his pockets.

Unlike the mole, which makes its tunnel by pushing the ground up into a ridge, the gopher operates from six to ten inches under ground, and, as a matter of course, must remove every particle of loosened earth to the surface to get it out of the way. Every few yards an opening is made, and the earth is deposited in mounds on top of the ground.

The gopher is a rodent of the worst type. No matter what impediment is met in his process of tunnel making, he never digs around it, if gnawing through is at all within the realm of the possible. There is always an unmistakable connection between a dying fruit tree and the cluster of loose earth mounds in close proximity. If the line of travel happens to be along a hedge, the living fence for yards together shares the fate of the tree.

The garden is a perfect paradise for this little marauder. The potato and onion patch, the flower bed and the well-kept walk are companions in misery. One gopher let alone in a potato field has been known to destroy two bushels of vegetables in a summer.

Lawns are disfigured with the fresh earth heaps which mark the progress of the industrious worker; and these miniature mounds in a meadow become real obstacles in the path of the mower, clogging the machine, dulling the knives, and provoking the driver to profanity.

If by chance the gopher opens his tunnel to the surface of the ground on the spot occupied by a shock of wheat or of corn, he is indeed fortunate. Here he can work in darkness and have the means of subsistence at hand. I have found many a shock of corn with the lower part completely imbedded in gopher mounds, and every ear within reach of the thief gnawed off close to the top of the pile of loose earth.

So troublesome did the gopher become in Iowa, a quarter of a century ago, that systematic efforts were made to exterminate the pest. In most counties a bounty of fifteen cents per head was offered out of the public treasury, and the well-to-do farmers gave ten cents in addition for every gopher caught on their own premises.

The scalp—a triangular piece of skin including the ears and eyes, and running down to a point at the nose—was produced as evidence that a gopher had been caught. In some parts of the State only the tail was shown, but this was sometimes unsatisfactory proof of the destruction of the animal, as the following incident will show.

A certain close-fisted farmer refused to pay the extra pittance for the great service which

the gopher-hunters were rendering to the country at large, and a plan of retaliation, as dishonest as it was shrewd, was adopted by the trappers. The gophers caught alive on this man's farm were carefully deprived of their tails and then turned loose to continue their depredations. The tails secured the reward from the county, but the miserly farmer received no benefit whatever from the transaction.

Gophers were so numerous that trapping them at twenty-five cents a scalp, or even at fifteen cents, opened up a most profitable industry to the country lad. Not only did boys abandon the regular work of the farm, to make more in three months at trapping gophers than their entire year's wages as farm hands would have amounted to, but the temptation was more than grown-up men could withstand. I knew one man whose income from this peculiar industry netted him one thousand dollars in a single summer. Aside from the pecuniary profit of the business, he gained not a little notoriety, and the nickname of "Gopher" Johnson clung to him long after he gave up the business.

The gopher is caught with a smooth-jawed steel trap. A chain a few feet in length is attached, by which the trap is secured to a stake outside of the burrow.

The place to set a trap is near the freshest mound in the little colony. An opening is made with a spade, and the trap set in the tunnel is carefully covered with pulverized earth. The channel is then darkened with a board laid flat on the ground, a hole an inch in diameter being left to let in a small quantity of light. This is a lure to the gopher, who must have total darkness in his underground realm. You stake your trap and leave it to do its work.

In the course of his daily rounds the gopher discovers that his works have been tampered with, and in his haste to close up the hole steps into the trap and springs it. The prisoner is usually caught by the foot, and is alive when found. Sometimes he springs the trap with his nose, and is caught by the neck and strangled in a few minutes.

The gopher is a very interesting little animal, but he is so shy that the naturalist who would study him thoroughly must be more than ordinarily cautious. I have seen thousands of his mounds which appeared to have been thrown up only a few minutes, but only once have I found the chap at his work. With his broad fore feet folded across his breast, he pushed the loosened earth before him, and leveled off his mound with all the precision and dexterity of a landscape gardener among his flower-beds.

Gophers are still numerous in parts of the West, but the incessant war made upon them with traps and with poisoned potatoes dropped into their burrows, has greatly reduced their numbers, and in a few years they will doubtless disappear altogether.

THE EUROPEAN LAND-RAIL OR CORN-CRAKE.

By T. O. Russell.

Next to the cuckoo the land-rail is probably the most curious of the birds of Europe. There is not so much mystery about it as there is about the cuckoo, but there is quite enough to make the study of its habits intensely interesting.

The land-rail is the *Rollus crex* of Linnæus. The family to which it belongs does not seem to be very numerous, and I do not know if any bird that can be classed as belonging to the same family is found on this continent, or if the land-rail of the British Isles is known on the continent of Europe.

overlooked by the inhabitants of the countries it frequents were it not for its song (?). No human contrivance, no modern composer of "scientific" music, ever succeeded in inventing any noise equal in discord to the sounds emitted by this most horrible croaker of the night; for its hideous *quack, quack* is generally heard when people want to sleep. I have been kept awake for hours on a still, balmy June night by these terrible birds. They delight in meadows and green fields. If such be near a farm house, and if the night be still, the inmates must be very deaf or very tired if

The Land-rail or Corn-crake.

The rail, or corn-crake, is a most awkward-looking bird. The length of its neck and of its legs is out of all proportion to the length of its tail, which appendage, supposing it to consist entirely of feathers, can hardly be said to exist in the "get up" of this curious, ill-shaped and stumpy-bodied bird. Its plumage is a dull brown of almost uniform tinge. Its size is somewhat larger than that of our American robin, but, owing to its unusual length of leg, it looks much bigger. Everything about the land-rail is displeasing; its proportions are unsymmetrical, its flight is awkward and its color is ugly; but all its imperfections of shape, and all its ugliness of plumage, would be willingly

they get much sleep. It is not the monotone of the corn-crake's notes that constitutes their chief horribleness; it is their inconceivable harshness; and how any apparatus of flesh and blood can continue to emit them for hours at a time without going all to pieces, is one of the mysteries connected with the corn-crake that has never been explained in a satisfactory manner. American tourists going to Great Britain or Ireland in the months of May or June should avoid stopping over night in farm houses if they are in any way troubled with insomnia; for if a corn-crake begins his nocturnal melody under their windows, their chance of sleep will be very slight. Bill Nye should

take a trip to Europe in order to write up this curious bird as he has written up the buzzard of the South.

The corn-crake is as careless in its general habits as it is unmelodious in song. Its nest is a curiosity, not of neatness but of untidiness. It lays generally four or five eggs, somewhat the color of its own dull plumage, but it would be a libel to style the place where they are deposited a nest. Not as much as with a single straw or feather does this slovenly bird adorn the spot in which its eggs are placed. If it finds a half-obliterated cow-track, the eggs are laid there; if no indentation can be found, they are laid on the plain surface of the ground, and the grass is tramped down about them. The young birds come out generally in July, and if not able to fly immediately on leaving the shell, they are at least able to run. They leave the nest the very day they come out of the shell; but this is not an uncommon thing, for young wild ducks do the same. The corn-crake almost invariably builds its nest in meadows, and as the young birds are running about in the grass when the meadows are being mowed, multitudes fall victims to the mowing machine, consequently this bird is said to be getting scarce, much to the delight of those who live in the rural districts and are easily kept awake at night. Half a dozen corn-crakes quaking together in the same field would prevent any easily disturbed person from getting a wink of sleep within half a mile of them.

This bird flies with great difficulty, and never to any great distance. Its wings are so short in proportion to its size that its power of flight is very limited. Any naturalist could see by examining it that it could no more fly over the British Channel than it could fly to the moon. I have frequently hunted these birds, and have seen many of them shot, but have never known them to fly more than sixty or seventy rods. In the face of these facts, a writer in the Encyclopædia Britannica has the temerity to say that the land-rail is a migratory bird, and goes in winter to the interior of Africa. Here are his words: "It makes its way to the shores, if not to the interior, of Africa." "It has been known to reach Greenland and North America, in every instance, we believe, a straggler from Europe or Barbary." Such a grave error as making the land-rail a migratory bird is something terrible to find in such a book as the Encyclopædia Britannica. The writer who made such a mistake must have had some other bird in his mind, for had he ever seen a rail of the kind about which he was writing, he would have known that it would be utterly impossible for a bird formed like it to fly across the sea. There never yet existed a land-rail of the kind about which I am now writing, and about which the writer in the Encyclopædia Britannica intended to write, that could fly across the channel between England and France, a distance of only twenty miles in a straight line. Where, then, does this bird go in winter, for it is never seen but in the summer or early autumn? The answer to this question shows one of the most extraordinary facts in bird life. The land-rail is a hibernating bird. It never leaves the land of its birth, but goes into a hole in the ground and passes the winter there. I myself dug one out of a smothered-up sewer near our farmyard in the winter of 1848. The bird was alive and apparently none the worse for its many months of imprisonment. It is a well-known fact to many naturalists and sportsmen that the European land-rail hibernates. By no other possible means could it preserve its life, even during the mild winters of the British Isles. The land-rail is evidently a grub or worm-feeding bird; it does not get its living in the water or marshes; it is not usually seen in swamps, but almost always in rich upland meadows. The food it lives on is not to be found in winter; it cannot fly to milder climes, and it is only by hibernating, or in other words going into a hole in the ground, that it can preserve itself through the winter. I do not know if it is a fact that any other bird hibernates, and would like to be enlightened on this point through NATURE'S REALM.

I have never known the land-rail to be seen in the fall. It may be that the young birds fly in August or September, but I have never seen one on the wing later than July. The probability is that the young birds do not fly at all during the first summer of their lives. They can run with great swiftness, and even the old

birds, when hunted by dogs in June or July, will often run for scores of rods before rising. The reason that land-rails are seldom or never seen after the first of September is probably because the old birds remain near the young ones, and as the latter can fly only with great difficulty, the old birds do not fly away from them, but remain with them until hibernating time, when both young and old birds go into winter quarters under ground.

It would be interesting to hear something more about this curious bird from some other person who has had an opportunity of studying its habits.

A SPRINGTIME SONG.

By Albert Bigelow Paine.

Flowers of spring, flowers of spring,
Showers and sunshine quickly bring ;
Scattered thickly o'er the meadow,
Clustered in the woodland shadow,
By the dusty roadside blooming,
Freshly, gaily, and perfuming—
The glorious air of the springtime fair
Here, and there, and everywhere ;
Flowers of spring, flowers of spring,
Showers and sunshine quickly bring.

Songs of spring, songs of spring,
Brooks that laugh and birds that sing,
Trees that whisper in the glade,
Winds that murmur 'neath their shade,
Butterflies and happy bees
Drowsing through the fragrant trees ;
Meadow larks that, soaring high,
Sing their carols to the sky ;
Quails that call, on left and right,
"Bobby White ! oh, Bobby White !"
Songs of spring, songs of spring,
Every being seems to sing.

Loves of spring, loves of spring,
Birds and bees and blossoms bring ;
When it comes we cannot guess—
Love that's born of loveliness ;
Roaming through the meadow land,
Heart to heart and hand to hand ;
Music sweet and meadows fair
Touch the hearts as light as air.
Loves of spring, loves of Spring,
Birds and bees and blossoms bring.

PROFESSOR JOE—A STORY OF THE SIOUX.

By Samuel Parker.

One fine morning in the spring of '81 found me mounted on a spirited Indian pony and galloping along the river trail leading north from Cheyenne Agency, Dakota, to Standing Rock. It was the month of April and the first shy tokens of spring were visible in the tender green of the slowly unfolding leaves of the cottonwoods and river osiers in the bottom lands, and in the vivid streaks of verdure along the margins of the sheltered water courses which threaded their musical way among the great yellow marl bluffs overlooking the turbial Missouri. A steady canter of about two hours brought me to the Cheyenne, the queen of all the Dakota rivers, the gleaming waters of which, from its junction with the Missouri, stretched away through a succession of cottonwood and willow groves, until its glancing pathway was lost to view in the far blue distance to the westward.

A large party of Sioux were encamped among the trees in the river valley with their ponies grazing along the banks, and among the willows in close proximity to the main village a number of little girls in variegated costumes of brilliant colors were busy as a colony of beavers, fashoning miniature wigwams of about the proportions of muskrat houses by bending and weaving together in a very ingenious manner the tops of willows and covering the frames thus constructed with blankets and shawls. Their animated conversation and ripples of musical laughter, as they went about their juvenile pastime, mingling pleasantly with the harmony of the prattling river and the contagious levity of the larks and blackbirds which, from the clumps of killickinick, were cheering the valley with their delightful whistling.

While fording the river, which was considerably swollen from the recent melting of the snow, my attention was attracted to an Indian on the opposite bank, and who was evidently awaiting my approach. He was mounted on a pony and a hunting bow with a handsomely decorated quiver containing his arrows was slung across his back. The Indian proved to be Roaming Bear, a handsome young brave of superb physical proportions, and whom I readily recognized by the waviness of his long raven hair, a peculiarity universal among the red men.

Water fowl were plentiful in the lowlands along the river, and Roaming Bear's destination was a certain bayou, lying on my route and distant about two miles above, where he expected to bag a few wild geese and ducks. In response to my query as to why he was armed with only the ancient weapon of his people, Roaming Bear launched forth into a very lugubrious account of a mishap which had but recently befallen him, and which had resulted in the loss of his favorite rifle. On a raft of his own construction, hastily improvised from drift-wood, Roaming Bear, with his rifle and his winter catch of furs, consisting of several bales of wolf, wildcat and beaver, had attempted to cross the Moreau River. The stream was swift and angry; the raft had collapsed, consigning Roaming Bear, his rifle and cargo of fur to the icy clutches of the Moreau. The furs had been recovered, but the mazawakan (spirit iron) had plumped to the bottom, leaving Roaming Bear minus a Winchester, and as a result of all of which his "heart was very bad."

While galloping leisurely along a sudden turn of the trail brought us into the midst of a densely populated town of prairie dogs, and my ineffectual attempts to bag one of the frisky denizens with a small pocket revolver proved sufficiently diverting to provoke a grim smile on the hitherto imperturbable countenance of Roaming Bear, who presently unslung his bow and favored me with an exhibition of his skill as an accomplished archer by impaling a dog on his shaft at a distance of about forty yards, without dismounting from his pony. The bayou alluded to soon hove into view, and a large flock of mallard ducks were feeding among the rushes on the farther shore. Being desirous of witnessing another display of the Indian's marksmanship, I withdrew with my

pony behind some bushes and awaited results.

Instead of dismounting, however, Roaming Bear threw his body horizontally alongside his pony, with one foot resting on the crupper and his left hand clinched firmly in the animal's mane, leaving the reins sufficiently slack to permit the pony to graze, meanwhile urging it gradually in the direction of the game. The stratagem proved entirely successful, for in a few moments Roaming Bear had approached to within easy range of the unsuspecting fowls, when, dropping lightly to the ground, he crept noiselessly as a shadow to a clump of tall weeds and prepared for a shot. The matchless pose presented by the figure of the kneeling Indian during the momentary period required to direct his aim was so superbly statuesque, that a faithful reproduction of the model in the form of enduring bronze by a Kemeys or Borye would have made a noble accession to the numerous trophies of their genius. The sharp twang of the bowstring was succeeded by the faintly audible hiss of the feathered missile, which, propelled by the arm of the elastic Indian, sped swiftly with an unerring precision, and instantly transfixed itself into the side of a splendid drake, the fatal effect of the shot being at once apparent in the futile attempts of the stricken fowl to rise and join in the convulsive flight of its frightened companions. So highly creditable was this second demonstration of my companion's skill that I was constrained to vent my admiration in a series of applauding cheers, which were heartily supplemented by a couple of loons which, at a respectable distance, had likewise been furtive spectators of the performance, and which, with the audacity of their species, awoke the dreamful silence of the valley with peals of hilarious laughter.

By consulting my watch I discovered that a further delay would preclude the possibility of my arriving at Devil's Island by nightfall, that being the point whither I had hoped to reach the first day out. I therefore resumed my journey at once, Roaming Bear kindly accompanying me for a short distance for the purpose of directing me to a point where an unused bridal trail debouched from the river valley into the midst of the hills, and which he informed me would surely lessen the distance sufficiently to permit me to reach my destination before dark. A few minutes' riding brought us to the trail designated by Roaming Bear, when, after presenting the savage with a box of prairie matches as a reward for his services, I again set forward, the watchful loons hailing my exit from the valley with a paroxysm of clamorous approbation bordering on the hysterical.

When fairly within the confines of the hills the trail became more broadened and distinct, winding sinuously through chambered gorges fingered with clinging pines and cedars, and past dank and sheltered marshes odorous with the aroma of bursting willow buds, and where the reigning silence was broken but not relieved by the lonely croak of the bullfrogs and the long-drawn call of the curlews from the russet uplands beyond. It was high noon when, to my intense relief, I emerged from the lonely recesses of the hills on to a long and level sweep of bottom land lying beside the Missouri River, its surface covered with a densely intermingled growth of diamond willow, whistle wood and rose bushes, with an occasional pine or cedar, and acres of mountain ash and bilberry trees. Having permitted my faithful pony to quench his thirst from the river, I selected a grassy spot beneath some trees on the bank, and, removing his saddle and bridle, picketed him out to graze, after which I unpacked my wallet of provisions and set about the business of appeasing my own hunger, with such a relish of the viands as only a protracted gallop over a rugged and uncertain Indian trail could provoke. At the conclusion of my solitary repast I stuffed my pipe with tobacco, and seating myself on my saddle blanket with my back resting against a friendly cedar, I abandoned myself to the blissful and soothing influence of the fragrant weed, the companionable virtues of which, from time immemorial, frequenters of the quiet wilderness have dwelt upon with an eloquent veneration.

The Missouri was far above the usual stage, and its impatient waters hastened by with an impetuosity morose and fretful, as if vexed and disgusted with its unsightly cargo of logs and other floating debris with which its uneasy bo-

som was encumbered. Occasionally the quick, gurgling swirl of the angry water against a drifting tree which had suddenly become anchored in the midst of the stream, would be borne to my ears, or a huge fragment of earth from an overhanging bank would descend with a rumbling plunge into the waiting depths below. In marked and pleasing contrast, however, to the brooding temper of the restless and complaining river, was the mellow whistling of the arctic tohees in the secluded copses, and the soft halloos of the mourning doves floating sweetly through the rustling boughs.

After the lapse of about an hour I shook the ashes from my pipe, saddled and mounted my pony, and again pushed forward, arriving within sight of Devil's Island late in the afternoon. When almost opposite the island the trail emerged from the smiling greenness of the river groves into a spacious bluff-sheltered valley, in the midst of which the wigwams of a large encampment of Sioux, comprising the band of Chief Yellow Owl, were scattered in picturesque confusion among clumps of wahoo bushes and the fire-charred stumps and snags of once majestic cottonwoods and cedars. Wishing to ascertain the whereabouts of the cabin of Narcisse Rencounter, a French-Canadian with whom I hoped to pass the night, I I directed my course to where a bareheaded and athletic-looking warrior attired in a gaudy red blanket, with fringed leggings of elkskin and moccasins beautifully worked with stained porcupine quills, was superintending the movements of a fine herd of ponies grazing on the outskirts of the camp. In response to my inquiry the Indian, with an expression of dignity like unto an ancient Roman senator, indicated the direction to be taken by a deliberate motion of his pony whip, remarking at the same time that the white man's cabin was still a half mile above, and added, moreover, that I would find it necessary to *wyunka nopa* (look twice) before discovering it, inasmuch as it was hidden like a wolf, in a thicket.

The Indians in this encampment were composed in part of the wilder portion of the Sioux, who, after the battle of the Little Big Horn, had escaped with Sitting Bull into the British possessions, and who had recently been transferred from Standing Rock to this, the Cheyenne reservation. But being without weapons, with the exception of hunting bows, their hostile character was apparent only in their strict adherence to the native costume of the tribe, and in the wildly fantastic dances in which scores of disaffected braves with paint-streaked faces, and resplendent with ornaments and bells, held nightly carnival.

Next to Yellow Owl, the acknowledged leader of the band, the most potential factor in the camp, was Thunder Hawk, a subordinate chief, whose unclad but symmetrically proportioned form during the exulting evolutions of the war dance was rendered still more conspicuous by the ostentatious display of ancient battle scars with which his body was liberally disfigured. Circular spots of lamp black distributed over various portions of the subtle Indian's anatomy indicated the previous visitation of white men's bullets, and painted arrows directed the observer's gaze to where the pointed shafts of the hated and cowardly Crows had found a lodgment, while crimson streaks and blotches of vermilion, from which cleverly imitated rivulets of gore trickled profusely down, betokened a close and cordial familiarity with knives and tomahawks. But the redoubtable Thunder Hawk's popularity rested not entirely on his reputation as an invincible warrior. Pretty Cloud, his daughter, was a maiden famed for her beauty throughout the whole Sioux nation—a girl whose strikingly handsome features of a decided Hebrew cast had won for her the complimentary appellation of "the handsome Jewess" from the military officers at Standing Rock.

Suitors innumerable had yearned to adorn their wigwams with this forest flower, but only to be encountered by the frown of an adverse fate. Even Whistling Elk, the youthful and favorite son of Yellow Owl, on whose copper-colored visage a few peculiar stripes of ochre and vermilion proclaimed the pining melancholy of an unrequited affection, had been favored with no privilege of exemption from the common lot. Indeed, the very desperate expedient to which the sullen and despairing savage had resorted, with a view to elevating himself in the tribe's regard and likewise win-

ning favor in the eyes of Pretty Cloud, had culminated in humiliation and disgrace. Young Whistling Elk, after mature deliberation, had resolved to signalize himself by meeting and coping single-handed with *ma-to*, the grizzly, and bearing home its claws as a trophy of his prowess. On his triumphant return the village would resound with his praise; the warriors would dance, and, best of all, Pretty Cloud, after plucking the thorns from his moccasins, would sing him to sleep.

For the space of three days was Whistling Elk immured within the privacy of his wigwam, industriously employed in "making medicine" before issuing forth to the momentous struggle. For three days did he prowl throughout the wilds of the Black Hills before coming upon the object of his search, which, alas! proved so utterly morose and unmanageable, and so terribly reckless with tooth and claw, that three days more were required for Whistling Elk to pull himself together. Meanwhile *ma-to*, somewhat vexed and disgusted, but in no wise routed, had ambled leisurely away to his lair.

One day an up-river steamboat, hailing from St. Louis, halted at the lower extremity of Devil's Island, directly opposite the Sioux village. Aside from a large party of choppers employed on a government contract, who disembarked at the island, there was a genteel and prepossessing man of faultless physique, with piercing black eyes, a sweeping mustache, and long, glossy hair, black as the plumage of the ravens that croaked in the island woods. Before proceeding up the river, however, the captain ordered a yawl to be lowered from the boat's side, in which the stranger and his luggage were deposited and paddled across the arm of the river to a bushy point only a short distance above the Sioux camp. When both man and luggage had been safely landed, the yawl, manned by the good-natured but awkward stevedores, put back to the steamer, leaving the handsome stranger standing on the bank, an object of curious interest to the Indians, who, on the first appearance of the 'fire boat," had flocked to the river.

[To be Concluded in May Issue.]

AMONG THE MOTHS AND BUTTERFLIES.*

By Julia P. Ballard.

A butterfiy in March! Velvety black, with wings bordered with a double row of yellow spots and the hinder wings tailed, having also the added ornament of seven blue spots (a nebula of dotted blue points with a frosted silvery sheen marking each spot). He is the *Papilio asterias.* You have seen him in May, June or July, hovering over a bed of phlox or other sweet flowers; but unless you caught him "in the bud," or, of course, when a caterpillar, you would not have him in the middle of March.

The sole occupant of a glass fernery, sipping from sugar-sprinkled moss with his long, uncoiled tongue, he seems quite at home, and sees nothing of the snow now whitening every branch and tiny shrub—knows nothing of the "April-fool," which, as Susan Coolidge says, spring throws to the flowers outside—the daring crocus and daffodil. With his moss, and some fresh snowdrops in a vase, standing in his glass house for dessert—an extra drop of sweetened water in their pure cups—he is monarch of his little world.

As a caterpillar he was handsome. At first a tiny black caterpillar, with a white stripe running through the centre of the body and across the tail, and covered with some small black dots or points. The next coat has but one white stripe across the middle, on the sixth and seventh rings, with orange spots beneath the black points, two white spots on his first ring and a row of white spots on each side. Then at last he has a rich coat, striped with black and dark green, and ornamented with deep yellow spots. But his chrysalis is quite plain, with nothing of the exquisite beauty of the green and gold house of the Danais. But when he leaves his shell, coming out by the narrowest possible front door, so that you must look sharp to see the thread-like opening, then he is much handsomer than the Danais butterfly. So, many people, living in plain tabernacles, and sometimes regarded homely by others, have something within, waiting to give great surprise when they shall have escaped, through a narrow door, into a world of wonderful light and beauty!

The *Papilio asterias* is very fond, in his caterpillar form, of the wild carrot, or garden carrot, parsley or celery, and any of the warm, aromatic plants, as anise, caraway and dill.

This March butterfly, as a caterpillar, was eating his delicate carrot leaves and seeds last September at the same time with the Danais caterpillar, and as we brought them fresh leaves day after day, and watched them go into their queer little houses at the same time, we did not know then but they would have their "opening" also together. But while the Danais was ready to come out in a fortnight or three weeks, the Asterias slept on until March—six months under his glass roof, without moving a hair's breadth, until he was out trying his new wings yesterday morning. Some other kinds of chrysalids have kept him company all this time, except that they have moved a little, and sometimes a good deal (when touched with a pencil or slightly blown upon), showing the life within; but not a particle—watch him never so closely—moves the Asterias. There were six chrysalids of this one kind under separate glasses, all of which were taken as caterpillars, and each of which I had watched go into his separate house. It is not a cocoon, woven, as some are, of their own hairs, or spun from some hidden substance through a spinneret, but, like the Danais', it is formed under the caterpillar skin, and when he is suspended as a caterpillar, with a silken thread holding him about the body, he drops off the entire skin, and it remains, as seen, beside his chrysalis, which is pale and nondescript in color, knobbed with many little round protuberances, giving it a curious rather than pretty appearance. When one was out the next thing was to look at the others, when lo! a most surprising revelation! Another chrysalis was

* "Among the Moths and Butterflies" is a charmingly written and instructive work on these insects, recently published by G. P. Putnam's Sons, New York, from which we reprint the ntroductory chapter.

empty, but the *front door* was very different! Instead of a crack, a thread wide and half an inch long, in the upper part of the back (the narrow black line in the chrysalis shows the butterfly's door), there was in the side a perfectly round hole the size of a pea; and trying his new wings (four narrow, glassy, blue-black ones) was something more unlike the butterfly than was the circular door he came out of unlike the narrow door of the Asterias. Looking something like a saw-fly, and more like a wasp, it was a large ichneumon fly. The parent ichneumon, having stung the caterpillar and deposited the eggs, the ichneumon was safe in his provided chrysalis home, when he woke up to a sense of his privileges, and not only appropriated the house of the Asterias, but literally lived on the occupant, eating him up and then making his own way into the world, leaving the chrysalis entirely empty and quite whole, with the exception of the round door. His head and slender body, antennæ and six feet, are all an ochre yellow. The eyes are large, jetty black and oval-shaped, and back of them, on the top of the head, are three round, black beads, in a triangular position. His body is joined to his head and shoulders by a pedicel, so long and slender that he is able to work from it like a pivot in all directions, giving as fine specimens of gymnastic operations as one often sees.

His veined, clear wings are exquisitely glossy, and he polishes their steel blue till it burns like a mirror. He has the vanity of a Beau Brummel, judging by the great pains he hourly takes with his entire toilet. Grasping both his long, trembling antennæ at once, and smoothing them out again as a philosopher would stroke his beard, nothing is left on one of their thirty-five segments large enough for a microscope to reveal. Then his wings and six legs go through the same operation, and he is ready for a fresh supply of sugared sweets. But alas! his mouth! If he had claim to beauty in every other particular, one good look at this remarkable feature in a mirror would secure his humility forever. An hour's close study with the microscope reveals no trace of beauty about it! The most curious transformations do no good in redeeming its unmistakable homeliness. There are three projections from it, impossible to describe; two seem like short, curved legs, with which it clasps its throat, and the centre is a curved affair something like the letter V. It is very much like the mouth of a wasp, but in such constant motion that one cannot guess at its exact shape or manner of manipulation.

It is well that it is so small that it does not detract from his looks except with the use of a microscope—and so long as he does not know it himself we will allow his vanity to be pardonable.

One such parasite will, however, satisfy us, and we hope only the *narrow* front door will open for the rest of the Asterias chrysalids.

MY SET OF GREAT HORNED OWL EGGS.

By A. C. Kempton.

"Dave! Dave Poor!"

"Yer call me, mistah?"

"Yes, come here a minute."

"All right, sah."

"Do you go in the woods much now-a-days?"

"Yes, 'er goodeal."

"Ever find any birds' nests?"

"Oh, yes'ir, lots in the summer way back 'a the Lakes. Loons an' ducks an' gulls—"

"Any owls?"

"Y-yes, sometimes" (rather doubtfully).

"They build on the ground, don't they?"

"No, holler trees."

"Think you could find any now?"

"Dunno—might."

"Well, see here, Dave, I know you're the biggest story-teller around here and perhaps you are fooling me, but if you find an owl's nest for me I'll give you a dollar bill."

"Will yeh?"

"Yes, I will!"

I turned on my heel and faced the March wind up to the house. There was my cabinet and there the place so long empty because I had no set of owls. I had tried so many times to imagine what effect the pure white shells would have, but imagination is an unsatisfactory article to fill a cabinet with. This Dave Poor is a kind of scapegrace who lives away back in the woods, and his meeting me when I was thinking of my hobby led to the above conversation. The whole transaction had passed from my mind before the end of two days.

March was dragging out her last week when one evening I saw Dave coming toward the house. I met him on the doorstep.

"Well, Dave, what's the news?"

"Gudday, sir. Yer said yer'd gimme a dollar to show yo' an owl's nest."

"Great Scott! yes, and so I will!"

"Well, I know a cat-owl's nest."

Dave got his dollar there and promised to meet me next morning at seven o'clock and take me to the spot. I tried to study that night, but my mind was thoroughly unsettled by visions of what might be on the morrow.

The following morning came cold and clear. Dave was on hand, and after a hot breakfast we started on our tramp—he carrying the bag of supplies and hatchet, I with gun, climbers and collecting case.

The Great Horned Owl.

We soon cleared the village, climbed the hill, spanned the valley and were struggling up the Gaspereaux Mountain. The snow was knee-deep and we had to break our own road. What earnest oologist cannot recall such experiences? How we sometimes have to work

for the hidden treasures. That tramp of nine miles will always be remembered by me. At last I got impatient.

"See here, Dave, for heaven's sake how much farther do you intend to take me?"

"Gettin' tired, eh? Only 'er mile 'er so now."

We had entered a thick spruce woods on a southern hillside. Nature slept, seemingly. Yet here dreams were disturbed by the occasional chatter of the squirrel as he contentedly gnawed his spruce bud and thought of beechnuts safely stored away in a certain stump; by the "*rat, tat, tat!*" of the busy woodpecker, the untiring entomologist of the woods; by the "*yang, yang, yang,*" of the red-bellied nuthatch peering into every crack and crevice of the rough bark to which it clings upside down. Now a few kinglets graced the branches—beautiful little fairies! Now a flock of American crossbills and pine grosbeaks flew noisily to yonder evergreens.

"*Whirr-r-r-r-r*"—what a noise that partridge makes as he rises a few feet ahead of us and makes good his escape. A rabbit, evidently surprised at hearing human voices in his domain, peaks out at us from among the undergrowth. Who does not love our wintry forests!

But now we are nearly there. Here is Davison's Lake. I last saw its sparkling waters dancing in the sunshine of a beautiful June day; now it is one expanse of pure white. Its surface is sprinkled with diamonds which the scintillating snow crystals have received from the welcome sun.

"See that 'ere big beech tree? That's it."

I was for climbing at once, but Dave objected, saying he wanted some dinner first. While we sat on a log and did justice to our lunch I had a better opportunity of observing the tree. It was one of the old settlers—probably a hundred years old. No limbs grew from slippery trunk within thirty feet of the ground, but there several branched off. One of the largest had been broken, leaving a hollow stem, and that was the site Dave said the nest was on. A large, half rotten, frosty beech is not the easiest tree to climb, but after a time I succeeded. Looking into the hole all I could see were Mrs. Great Horned's eyes shining with supernatural light. She was soon placed snugly in the game bag for future attention. After much struggling and strong language the top was broken away, and, yes, there were the eggs so cosy and warm on the few leaves at the bottom of the cavity.

As I sit here writing this that great horned owl stares at me from over the door, and "that place" in my cabinet is no longer empty.

SEALSKINS AND SEAL FISHERIES.

The animal population which has hitherto supplied us with the luxury of sealskins is rapidly being exterminated, says a writer in the Glasgow *Herald*, and it is quite within the bounds of possibility that our descendents will be unable to procure a sight of the once plentiful material anywhere but in natural history museums. The scarcity of sealskins is an inevitable result of the over-fishing procedure, which seems to attend well nigh every human enterprise nowadays. Sealskins, as articles of commerce, it may first of all be mentioned, do not all belong to one and the same category, and this for the plain reason that there are seals and seals. Every one knows the common seals which inhabit the waters round our own coasts. Creatures, these, possessing dog-like heads, mild eyes, and a body which tapers toward its extremity, while the limbs number four and are converted into swimming paddles. The front paddles are short and the hinder ones, which are connected with the short tail by a fold of skin, are stretched out behind. The ordinary seal is but a clumsy body on land. It wriggles and rolls with evident helplessness when placed on the shore. In the water, however, the whole aspect of affairs is altered. It is active, agile and graceful in its proper habitat. Its body is modelled on lines which fit it for rapid progression through the waves. The hinder part of the seal's body, together with the back limbs or flippers, constitute a kind of screw propellor. Moved by the powerful muscles of the trunk, it glides through the water, while the front flippers serve to steer the animal in its evolutions. These seals, together with their neighbors which give us sealskins, belong to the carnivorous order of quadrupeds. They share many characters in common with the lions, tigers, bears, dogs and like animals; their own and special features consisting in their adaptation to a marine life. Naturally, like whales, they have to ascend to the surface in order to breathe. As a primal feature in connection with the history of the ordinary seals may be mentioned the fact that they possess a very wide distribution, both in temperate and arctic latitudes.

The seals from which the sealskins of commerce are obtained present certain characters, on the other hand, of equally distinctive and prominent kind. To begin with, they are often named eared seals, from the fact that, unlike the common seals, they possess a small and rudimentary outside ear. In their general appearance, also, the eared seals are different from the common seals. They are often named sea-lions from the fact that the head and face are somewhat leonine in aspect, and because some of them at least possess a well-developed mane. The sea-lion's head is thus set upon a very distinct neck, which is practically unrecognizable in the common seal. The hind quarters, again, terminate more abruptly than in the latter. The front flippers are much more distinctly separated from the body than is the case with our native seals; so that, as far as movements either on land or water are concerned, these members are more efficient instruments than are the corresponding appendages in the ordinary seals. Then, also, the hind legs or flippers of the sea-lions are not directed straight backward, as in the seals, but are placed somewhat outward and forward. These members, in fact, although they serve all the purposes of swimming paddles, yet far more effectively act as true limbs than is the case in the seal tribe.

In swimming the sea lion uses both pairs of limbs, while on land it is by no means the awkward animal that the ordinary seal appears to be. Indeed, on the ground the sea lion is extremely active. It can run almost as fast as a human being, and it certainly climbs over its rocky ledges and steps with the uttermost ease. Such is the animal from which the sealskin of commerce is obtained, regarded from a zoölogical point of view. It was the French naturalist Péron who in 1816 gave reasons for separating the ordinary seals from the sealskin seals or sea lions, which had before that time been classified with the common members of the

group. Péron had voyaged in the South Seas, and had noted the presence of an outer ear in the sea lions—a character which, as we have seen, is still used in zoölogy to indicate the sealskin bearers. Before the days of Péron other voyagers had described the eared seals. They were also called "sea lions" and "sea bears." As regards the different animals included in the sea lion tribe, it may be said that from eight to ten species are well known. These, it need hardly be added, vary greatly, both in size and other physical features, as well as in the degrees of commercial importance with which they are regarded.

Concerning the quarters of the world in which fur seals are found, we discover that they are more limited in range than are the ordinary seals. Thus, it may be said that they are found on the Pacific Coast of South America, although they also extend their peregrinations as far north on the Atlantic Coast as the River Platte. They are met with on the Californian Coast, and can be traced to the Aleutian Islands and to Japan itself. Southwards, they occur on the New Zealand shores, Tasmania, and the southeast shores of Australia. Kerguelen's Islands numbers them among its population, and an odd species has made its habitat at Cape Town; although it must be confessed this latter form must be regarded rather as a straggler than otherwise. The Prybilov Islands to the north may be cited as their limit of distribution in that special direction, and one species, the so-called "sea bear," has its chief quarters in these islands, and has furnished an immense number of skins to commerce for well nigh a century at least. It is certain that all the species of sea lions known are by no means equally valuable when regarded from the point of view of the fur trade. The skin of certain forms is more valuable than that of others. It is to be noted that it is the soft, silky under fur, which may be compared to the down in a bird, that is valued as sealskin when dressed and submitted to the other operations of the furriers.

Doubtless it is the extent of this under fur which constitutes any one species of sea lion valuable from the commercial standpoint, and there seems to be a consensus of opinion that this fur varies considerably in amount at different seasons of the year. The seals are killed usually by a blow from a wooden club, and are then skinned. The fat is also an article of commercial value, for, like the whales, the sea lions possess an ample coating of fatty tissue, which, in addition to lightening the body, preserves an equable degree of warmth. Preserved by a salting process, the skins are sold to the furrier with the original and outer coarse hair still present, the soft under fur being concealed by the shaggy outer coat. The method by which the sealskin or under fur is left and the coarse hair removed is said to have been the result of an accidental observation. In olden days the hairs of the outer coat were simply pulled out singly, so as to leave the under coat or true seal fur. It was noticed, however, that the hairs of the outer coat were more deeply implanted in the hide than those of the under fur. This discovery, therefore, made it possible for the furrier simply to shave the skin from the inside so as to divide and separate the coarse outer hairs from the skin, and these hairs can therefore be washed off, leaving the rich under fur untouched, and ready for the dyeing operations to which it has to be subjected. A sealskin jacket or cape is thus really composed of seal's "down," as it were, dyed and dressed, and under the latter procedures the under fur becomes smooth and destitute of the somewhat curly structure it exhibits in the rough.

NESTING AND BIRTH OF BIRDS.

By Francis A. Knight.

There is no time in all the year in which some young birds do not begin to earn their first experience.

Sparrows and starlings sometimes leave the nest in the very depth of winter. Robins have been hatched at Christmas. Waterton found in December even a young owlet wearing still its dress of down.

But it is now, when woods are greenest, now in the warm June weather, that the tide of life is rising to the full. Now it is that we hear on every side, from hedge and tree and housetop, the childish voices of the young poets of the air.

Not a tithe of all the gathering multitudes can ever see a second season. For the weasel and the sparrow-hawk, the catiff crow and all his brother bandits, will hold high revel in the covers.

Were it not for the balance which is thus maintained, we should be overrun altogether by crowds of hungry birds.

Nature manages her own affairs much better than we can, with our tinkering interference. If hawks were spared and magpies left in peace, we should hear very little about plagues of small birds.

Even the owl, impelled by the needs of her nestlings to start on the chase somewhat earlier in the day than usual, may pick up a casual youngster here and there that happens to come in her way.

It is very little, however, that owls do in this direction. The very hours they keep ensure their paying attention more to fur than feather, and careful examination of the ejected remains of food that accumulate in their haunts has proved again and again that birds form a very small part indeed of their customary diet.

The eagle owl, indeed, has been known to bring home partridges and blackcock, and even dead lambs.

But the eagle owl is a stranger here; when he does pay us a visit he meets with a reception that precludes all hope of his return.

The owlets who were hatched in the early days of May are hardly ready yet to join the twilight forays of their elders. An odd-looking crew they are, huddled together in their hollow tree. Even the old bird is a ludicrous object.

But, after all, the eyes of day have no business with the bird of night. It is only in the twilight that he wakens into life. Sallying out at dusk from his snug retreat in tower or tree, he floats like a phantom over the fields on his soft and soundless wings; or, perched in one of the tall elms on the edge of the meadow, startles the stillness with his mellow call.

To the owlet spreading for the first time his downy wings to leave the shelter of his home, the outer world is altogether strange and new.

Ever, indeed, will he look upon the landscape with other eyes than ours. For him the shadow goes backward on the dial. The fire of sunset is to him the light of dawn; his day, the silent hours of night lit with cold stars or keen full moon.

Some birds there are who, early in their young experience, learn something of the stir of life. Young kingfishers, hatched in the darkness of their tunnel, come to the entrance and look out long before their wings are grown. They grow familiar with the hum of the mill and the dreamy plash of the old wheel; they watch the play of ripples round the stones; they see the cloud of minnows dart like arrows up the stream.

But to the young jackdaws in the tower the world at present means no more than a grim Norman wall, a brief stretch of narrow, time-worn stair, a single gleam of daylight overhead.

The whole ascent is strewn with piles of sticks and heather. Above the belfry the way is blocked entirely by the great nests that the old birds have heaped even four feet high upon the ancient steps.

And now the time approaches when the dark-coated nestlings begin to scramble off their nests, and flutter up the winding stair toward that narrow chink above them. They have heard but little yet of the stir of life, beyond the hum of the village or the clangor of the bells.

Now they look down upon a great world far below them, a world of blossoming orchards and rich meadow lands. It is their first sight of tree or sun or sky.

Four gray heads look anxiously down from the narrow threshold. Their elders all the while are wheeling round the tower, floating now and then near by, as if to tempt the timid aeronauts to make the first perilous plunge.

One of them gathers heart and flutters out. He gains the footing of one of the gargoyles that the barbarous "restorers" have spared to the gray old pile, while all the neighbors shout a chorus of encouragement. Another spreads his wings and alights on a battered scrap of carving on the wall.

Now all four have passed the brink, and one by one they gain the battlement of the tower, fluttering from point to point, until at last they muster courage to trust themselves upon the yielding air, and follow their parents to the fields below.

It is a strange collection of materials that the jackdaw loves to accumulate in its untidy nest. Sticks and paper, carpet and cowhair, bits of cloth and scraps of string, are all made use of.

Most birds that are hangers on of men, and find a living in the farmyard or the street, are ready to avail themselves of the handiwork of their suzerain in the construction of their nests.

A stray end of string or worsted used in this way as building material has, ere now, brought dire disaster on the unfortunate architects. One old bird even contrived to hang itself in a loop of worsted. Young sparrows, snared by the lining of the nest, have been imprisoned until late in the winter, fed all the while by faithful relatives, until some kindly hand released them from their bondage.

Although many broods are fledged already, and many more will soon have taken wing, there are not a few birds that still possess their souls in patience, warming their unhatched eggs.

The kestrel, in her crevice in the cliff, has heard no faint note of life beneath her sheltering feathers.

Still the goldcrest is swinging in her snug green hammock among the dark leafage of the churchyard yew. A tiny nest it is to hold so much. A family of eight have to find room in it, under their mother's wings. But they are a tiny race; five of them full-grown would not amount altogether to a single ounce.

Less fettered still are the swifts, whose labors have hardly even yet begun. Still on their untiring wings they career with joyous screams across the sky.

Astir before the day begins to glimmer in the east, on the wing through the hot summer noon, still flying when the gold of sunset has faded from the sea, all day long they wander in the air.

The nest of the swift shows but little art in its construction, nor is it always, indeed, the work of the bird itself. It will, occasionally at least, appropriate a house-sparrow's nest, whether occupied or not; and more than once has a brood of young sparrows been seen which had apparently been turned out by the swifts and left to perish on the ground.

The sparrow, for his part, is much addicted to seizing on the nest of a swallow—more frequently still on that of a house-martin, even when just new from the hands of the builders.

It has often been said that the aggrieved owners have been known to call in the assistance of sympathizing neighbors, and that the assembled troop have then walled up the unfortunate sparrows—to die of starvation in their ill-gotten hold. Happily, however, for the reputation of the martin, it is very doubtful if there is any real authority for the story.

Swifts seem unusually abundant this year (1889), but swallows and martins have come back to us in sadly diminished numbers.

The reason for this difference is not far to seek. The dark plumage of the swift has no charm in the eyes of the high-born beauties, for whose adornment so many thousand lives have been sacrificed this spring.

The destruction of swallows has, indeed, been most lamentable. The report recently presented to the Zoölogical Society of France, after describing how the birds are taken and for what purpose they are killed, urges that the French Government should interfere to protect a race whose services to man are beyond all calculation. So great has been already the havoc made, that there are parts of France where the

swallow, once numerous, is now unknown. "If this destruction goes on for a few years longer," continues the report, "France will in ten years have no more swallows except in her collections."

Unhappily for us, the homeward path of our migrants lies through France, and thus it happens that our own particular birds are killed in thousands on the Mediterranean coast as they alight, spent and breathless, on the land.

The most destructive means employed is the treacherous wire, on which the tired travelers too trustfully alight, and are slain wholesale by an electric discharge.

This is a swift, and perhaps a painless death, but the report alludes also to snares and even hooks. One shudders to think of the little creatures fluttering in agony upon a baited hook—for what? To furnish an adornment for some Parisian belle "all gentleness, mercy and pity."

This is the reason why this year so many of us miss the pleasant twitter of the martins round our eaves; why the nests where we have so often seen them cling are crumbled and deserted. This is why the swallows come no more to their nests among the rafters.

How dark to us would be the dawn of spring if on the empty sky we should watch for them in vain! How cold the summer days in which we heard no more their snatches of sweet song, nor caught the glitter of their sunny wings! They would be to us as to the poet the vanished faces of his friends—

> "Something is gone from Nature since they died,
> And summer is not summer, nor can be."

[This delightful leaflet is taken from "The Idyls of the Field," by Francis A. Knight, and published by Roberts Brothers, of Boston. A companion volume, "By Leafy Ways," by the same author and publishers, is now on our table, and both books are replete with matter that will charm all readers who are fond of natural history.—ED.]

NOTES FROM MONTANA.

By Charles Hallock.

One of the best animal painters in the world is Charles M. Russell, of Cascade, Montana, who is popularly known as the "Cowboy Artist." His specialties are frontier scenes, wild Indian life, cattle pieces and natural history subjects, all of which are literal in their similitude and imbued with a truthfulness of character and detail which it is possible only for those to attain who are to the manner bred. At home his work is in great demand at high prices, but he prefers to round up a herd of cattle, or cut out a steer, rather than paint. Only his absolutely leisure moments are employed in this occupation. It is a pity that one so gifted, and enjoying such exceptional opportunities for the culture of his favorite art and pastime, should not be willing to place himself in the way of securing a world wide reputation. Mr. Russell's private mark is a buffalo skull in the corner of his canvas, and by it all his works are known.

In the Pontet ethnological collection at Great Falls is a great variety of Indian costumes of various wild tribes, over whom the wave of civilization is gradually sweeping, and all persons interested in the traits and costumes of the American aborigines can here examine original articles and objects which later on will become obsolete except as museum curiosities. Some of the plumed war bonnets and gala costumes are unique and quite expensive, especially those trimmed with the traditional war eagle feathers; for these are hard to obtain now, since there is no more "running meat" on the plains to attract the birds. The big braves of the Redskin community are glad to procure the indifferent wing-plumes of the vulgar buzzard as substitutes. Some use the feathers of the horned owl. In old times the enterprising young bucks used to temporarily immure themselves in the carcasses of elks and bisons, and when the eagles collected—for "where the carcass is, there the eagles are gathered together"—they would reach out a sly hand and snatch the birds of freedom by the leg, and so capture them unawares. It used to be a rule of the tribes, which still holds good in most cases, that no one could wear the eagle plumes unless he had earned the right to do so by making his "coups" in battle. Every scalp taken was a coup, and each coup was represented by an eagle plume in the bonnet. An ornamented coup-stick was employed by noted and active warriors in the sanguinary days to keep tally with, a notch being cut in the stick for each scalp taken. The Indians always like to air their trophies on festive occasions, and whenever a dance is going on they don their headgear just as civilized persons do their coiffures at a ball or party. At most other times they attire themselves in plain costmes or undress regalia.

John Sinclair, of Great Falls, is a painstaking and intelligent naturalist and sportsman who has specimens at his place of nearly all the birds and animals of Montana, many of them in duplicate, as well as many valuable fish specimens. Such a complete collection as this should find its way eventually into a State museum, where they can be more securely preserved. Many species have already become almost extinct, and specimens will increase in value as time progresses. John is always glad to receive and entertain intelligent visitors who don't ask foolish questions, and he will take sportsmen to the best game locations at the proper seasons. The best remaining hunting regions of Montana are directly accessible from Great Falls.

THE AQUARIUM.

CONDUCTED BY HUGO MULERTT.

[The Editor of this Department will cheerfully answer all queries relative to the conduct of Aquaria.]

THE NEST-BUILDING STICKLEBACK.

Sticklebacks are wonderful fish and with hem many wonderful things are possible. We know of no other fish that harmonize their colors to the surroundings as do the sticklebacks. Take the many-spined stickleback as an example. In a pond at Maspetto, L. I., which has a bottom of white clay, and was so situated as to be under the full glare of sunlight nearly all day, the color of the sticklebacks was that of a dirty white. A half mile beyond this pond was a ditch containing peaty water; here the same variety of sticklebacks were brown. A few yards beyond this ditch was a hole, the bottom of which was black creek mud; here the sticklebacks were jet black, even to the eyes. The male fish of the two-spined species, *Gasterosteus aculeatus* (see illustration), are more wonderstill, as illustration of this fact. The first indication that a male stickleback is about to construct a nest is the taking on of green and red colors, the eye at the same time becoming blue. When the nest is completed, and the time has come to either coax or drive the female to deposit her ova in the nest, then the colors of the male become wonderfully intense, the red on the lower part of his body becoming almost luminous. These colors the male retains until he abandons the young sticklebacks to shift for themselves.

In nature the male stickleback always selects material for his nest that is in keeping and harmony with the surroundings. This is a wise precaution for masking the contents of the nest from other fish, particularly the sticklebacks, who are very fond of fish eggs.

The following description by one of our friends will assist you when about to establish a "sticklebackery" without being in possession of a regular aquarium tank:

"Up in the hay loft was a box of window glass. Taking a number of panes of glass, I formed in a washtub a series of compartments in the following manner: From the centre of the tub the panes of glass radiated until they came in close contact with the sides of the tub, thus forming a series of acute angles; the bottom edges of the glass were then crowded down through the three inches of sand till they rested on the bottom of the tub. In the apexes of the angles bunches of water plants were planted; this also helped to sustain the glass compartments, as well as to keep up thorough oxygenation of the water. In each compartment I placed a pair of sticklebacks, giving them a meal of angle worms before leaving them for the night. Next morning when I examined the tub, to my great surprise many nests had been made during the night. In some of them the bright yellow eggs showed plainly through the openings of the nest. Every nest was vigorously ventilated by the male fish, who were hard at work fanning a current of water on them with their pectoral fins. In one compart

ment a male fish was tearing off small pieces of confervæ that grew on the water plants, which he carried in his mouth to the nest, packing it down with his snout. After placing several mouthfuls in this way he fastened the pieces together more compactly by pressing them down with the under side of his body, at the same time exuding a marine glue, so to speak, that cemented all together. In the centre and on the top of each nest were four orifices, and into these the male, after a considerable display of anger and much labor, at last drove the female, her head projecting far enough out to allow her to breathe. A few minutes later the male drove her out of the nest again, head first, and entered himself, passing over the eggs in the same direction the female had, and fertilized them by spreading his milt over them. In an instant he was out, flashing all over with blue, green and orange, his eyes looking like small turquoises. When the openings of the nest became too large, he contracted them by patching on more confervæ. Over the nest he remained day and night, changing from one opening to another, constantly fanning a current of water through them. Whenever poor Mrs. Stickleback showed herself her mate drove at her fiercely, biting her until she was glad to hide among the water plants. The trouble was that she would have eaten all the eggs if she had had a chance, and he knew it. For this reason I took all the females out as soon as they had deposited their eggs. As each nest was completed and the eggs deposited I withdrew the glass partitions, but a terrible battle taking place between the males, I had to replace them. Even then they would try to fight each other through the glass. When all the eggs were hatched, and the bottom of each compartment seemed alive with young sticklebacks, I removed all the male fish and glass partitions, and in a few weeks was the happy possessor of a large school of inquisitive, restless, baby sticklebacks."

To this we add, from our own experience, that all the females, after depositing their eggs, refused to eat chopped earth worms, on which we used to feed them, and died in one or two days after. The young fish made their appearance twelve days after the eggs were deposited.

BIRD SONGS AND VERNAL SOUNDS.

By Isaac McLellan.

O'er Nature's realm what mellow tones salute
The listening ear in field and wood and sky!
Sit thou on mossy bank, by rippling stream,
And note the varied melodies that rise.
The brook itself hath harmonies of its own,
Whispering o'er sands or hoarse o'er pebbly bed.
Enjoy the solitude that Nature holds
And view all pictures of the natural world!
See on yon rock a speckled turtle basks,
Or slips with sluggish motion to the wave;
The birds swing merrily on the bending spray,
Or to their fledglings speed on fluttering wings;
The water snakes glide leisurely o'er the stream,
The grasshopper springs snappingly o'er the grass,
The cricket chirps its never-ending cry,
The marsh frogs pipe their shrill, perpetual chime;
Listening we catch the distant sound of bells,
And in deep woods the sharp report of gun,
The blast of horn, the cracking of the whip,
As the keen riders hunt the deer or fox,
The cattles' bellow in the upland fields,
The bark of dog, the crowing of the cock,
While the soft rustles of the billowy grain
Melt on the ear in tenderest cadence.

Sweeter than all these rural, pleasant sounds,
Are songs of tuneful birds in liquid choir;
Of all created things those minstrel tribes
Are blithest, happiest children of the air!
Whether in circlings high, in airy flight,
Or poising on the topmost twig of tree,
Trilling their clarion song in morning air,
It seems embodiment of boundless joy;
Freed from all stern calamity and care,
Perpetual youth its birthright seems to be.
Age may not stiffen those elastic wings,
Nor change the joyous, overflowing song,
To melancholy plaint or mournful note!
Blithest of birds, yet not sweet birds of song,
Are swallow tribes, glad harbingers of spring,
Yet have they many chirpings in their flight,
Darting o'er farmer's roof or harvest field;
Prospects of spring time, they enjoy a life
Of merriment 'midst Nature's fairest scenes;
Winter to them is all an unbroken time,
For they forsake in autumn our brown fields
To seek the myrtle and wide orange groves
Of some fair region of far Florida;
With the spring flowers they haste to us on wing,
And with the early frosts their farewell take.

NOTES AND QUERIES.

[Under this Department Heading queries relative to all branches of Natural History will be answered.]

Tenacity of Life in Animals.

The lower we descend in the scale of animal life the more deficient we find those organs which, combined, form the monad and man, yet in all cases these creatures are formed correctly for the life they lead. In no case, excepting the abnormal ones, are their powers of perception and action inadequate to their manner of existence.

I made some experiments relative to the degrees of tenacity of animal life in the lower vertebrates, as well as insects, etc., and was surprised to learn to what a wonderful extent of injury these creatures may be subjected without totally destroying their vitality.

A beetle of the large snapping species (*Elater oculatus*, L.) was quite active twenty-four hours after decapitation; a wasp was alive eight days impaled on a pin. It is generally supposed that bees die after losing their stings, but this is not always so, as one which stung me and left its poisonous javelin in my skin was carefully attended and did not seem badly crippled, but fed on the pollen of cherry blossoms. It was agreeable to find that the industrious insect did not reacquire its means of defense while in my possession.

Spiders cannot only survive the loss of at least four legs at once from their set of eight, but will be supplied with new legs in place of those torn off.

The tenacity of life in reptiles is proverbial, and particularly is this noticeable in the turtle class. I can attest to the following case: A turtle, known as the snapper (*Chelydra serpentina*), was decapitated preparatory to making him into soup, an agreeable dish, when a few experiments were tried on him. His legs were going in the swimming movements constantly, and he would walk off briskly on land when a live coal was dropped on his back, after the manner cruelly followed sometimes on live turtles. His jaws would open and contract, and at last the trial was made to let the dissevered head bite the long tail, after which the body was placed in the water, and we had the peculiar spectacle of a turtle swimming off as in life, almost, with the rigid jaws of the head strongly gripping the tail. From some natural cause, call it instinctive, if you will, the legs took him rapidly into deep water and we lost him.

I know of a massasauga, or the common prairie rattlesnake (*Crotalophorous tergeminus*), which was kept in captivity for over three months, during which time it never ate a thing, although it was offered food. This poisonous specimen was freely experimented with, and was forced to use its venom on small mammals weekly, yet it lived through its bondage and finally escaped.

It should not be understood that these ventilations were made with a view to producing pain. On the contrary, pain is but little felt by the lower animals.

Nest-Building Fishes.

It is generally supposed that fishes take no care whatever of their young, leaving them entirely to the attention of nature; but the fact is much otherwise with many species. The most remarkable point, however, regarding certain fishes is, that the males do the care-taking and not the females.

If you will go out any time during the month of August, in this latitude, you will see in streams and ponds big catfish of the common sort, each one accompanied by a swarm of small fry. In each case the old one is a male and he is engaged in taking care of his offspring. If an intruder comes near he will dash at him and drive him away.

It has been known for a long while that catfishes had this way of guarding their young; but only lately has it been ascertained that it was the papa fish which did the care-taking.

Some time back there was a pair of catfish in one of the aquaria at the building of the Fish

Commission, in Washington. At spawning time eggs were laid and one of the parents kept watch over them, not permitting the other to come near. The young were duly hatched and thrived, being cared for in this way until they were big enough to look out for themselves.

In their native ponds and brooks you will find large broods of young catfish as big as three-fourths of an inch in length remaining together in schools, each school accompanied by the male. Sometimes the latter will swim slowly along in the centre of the young ones and at other times alongside.

In laying their eggs, the parent catfishes select a spot where the water is quiet, if possible protected by aquatic plants, and there they make a nest, perhaps eight inches by six, including the spawn.

The nest has a soft outer envelope, and over it the male hovers, forcing fresh water through the mass by rapid vibrations of his fins, until after about a week they are hatched.

Sometimes the male catfish takes care of its young in a still more peculiar manner. There is a kind found in the sea, the eggs laid by which are as large as a small bullet. These eggs are found in the mouths of the male, which do this to protect them.

After the eggs are laid, the parent catfish takes them into his mouth and keeps them there until they are all hatched, when they go out and take care of themselves.

But this method is not confined to the catfishes. There are found in Africa and South Africa a species which resemble the sunfish of our own streams. These "cichlids," as they are called, are also plentiful in Texas and Palestine. They are often found with their cheeks fairly bulging with young.

In the Sea of Galilee the cichlids are so numerous that the miraculous catch of the time when St. Peter fished there might be repeated any day, it being the manner of these fishes to move about on the top of the water in solid masses, covering many square yards and making a noise like that of rain pouring.

The Kibi—Maori Skulls.

During a visit to New Zealand Dr. Fristedi, says *Galignani's Messinger*, succeeded in obtaining a specimen of the quaint and almost extinct kibi bird. This bird is somewhat like an ostrich, but only the size of a crow; it has no wings at all, and is covered with fur-like, short striped feathers. Another peculiarity about the kibi is the fact that its egg is larger than one-third of its body. He also succeeded in bringing home some Maori skulls, which are difficult to obtain on account of the manner in which the natives bury their dead. When the bodies have been so long in the ground that all the flesh has fallen from the skeleton, they unearth them and carry them into the interior of the forests, where they are deposited in natural caves, which are very difficult to find. Anybody discovered with one is sure to be killed.

A Large Sunfish.

An immense sunfish was recently captured near St. Augustine, Florida, which I had the pleasure of examining. It was estimated as weighing 600 lbs., but was probably a hundred pounds lighter. The following dimensions will give an idea of its great size: Extreme length, 8 feet and 2 inches; depth from tip of dorsal fin to tip of anal, 9 feet 9 inches; the dorsal fin measured 40 inches in length. The mouth was very small and provided with two teeth* on each of the jaws in front, somewhat resembling the teeth of the rodent mammals. The skin was thick, rough, leathern and elastic, without bony plates and resembled the skin of some salt water dog fishes. Dorsal fin beginning not far back of pectorals is short and high. No large spines on the body.

This strange fish is the sunfish, headfish or mola (*Mola rutunda*, Cuv.), and belongs to the family *Orthagoriscidæ*. It was included formerly in the family *Diodontidæ*, meaning two-toothed, from the arrangement of the teeth. The word *mola* means millstone, and is given from the shape of the fish. The body is much compressed laterally; giving it greatly the appearance of our common sunny, *Lepomus* of the north. The *Diodon*, porcupine fishes, are not far removed from this fish, although differ-

* Or, perhaps more properly, one tooth divides apparently at the median line by a suture.

ing so much in external appearance. The sea sunfish is not provided with an apparatus which can be used as an inflating machine.

M. G.

Coquina Rock.

This peculiar conglomerate is almost entirely composed of shells. In many instances the shells are in a nearly perfect condition, but generally the conglomeration is a mass of disintegrated substance; sand, gravel and crushed shells, held together by Nature's cement of the long ago, and which is not now manufactured. In many parts of Florida this rock is to be found plentifully about the coast and, to an extent, inland. The buildings of the early settlements were composed of coquina, and about St. Augustine many still remain as evidence of Spanish enterprise. Old Fort Marion, which was begun as early as 1568, is a massive structure, made entirely of this rock.

At Eau Gallie, on Indian River, a condition exists which has not as yet been satisfactorily explained. The bottom near the shore is of coquina rock and for a long distance perforations may be seen beneath the surface of the water, and at times the water forms in little eddies over these minature wells. They vary in diameter from six to eighteen inches and extend down to quite a distance.

Much speculation has resulted from the finding of these singular shafts, but the most reasonable theory is, that they are places left vacant by decomposed palmettos which were once growing on dry ground. The land sunk and was finally encroached upon by the sea; in due time the sand, gravel and disintegrated shell substance was borne in by the action of the waves filling the space between the trees, and to a depth differing in various localities. It is well known that the cabbage palmetto is very serviceable used as a pile, being employed almost universally for that purpose in Florida, as it will withstand salt water action for a long time.

After a certain time Nature completed the work of solidification by means of her cement, and at last the decomposed trunks were entirely removed by the action of the waves, thus giving the singular appearance of these cylindrical spaces.

That this theory is correct seems more probable from the fact that, in some sections, evidently formed by the action of Nature, the same holes are observed above the water line as are seen beneath the surface. The coast of the State has had several upheavals and subsidances and some scientists have demonstrated as many as five.

G.

How Snakes Swallow Fish.

In answer to Morris Gibbs, in the *American Angler* of March 14th, I would say that I have observed water snakes swallow fishes when in a wild state and when in confinement, and never saw one taken down other than head first. The reptile will generally seize the fish near the middle, crosswise, and after holding it until it ceases struggling, turn it and swallow it by throwing first one side of the upper jaw forward, getting a hold with its teeth, then bringing that side back while the other side is thrown forward and a hold secured by that side, and so on. I conclude that the upper jaw is articulated in the centre in the species which I observed, but I neglected to make an examination to settle the matter.

J. J. S.

Cats Affected by Feeding on Scallops.

Will you kindly inform me whether there is any truth in the assertion that a cat's ears are affected by a diet of scallops? On Long Island, and in other localities where scallops are plentiful, the cats belonging to persons engaged in fishing are all affected by a peculiar skin disease almost invariably affecting the ears. The affection is called cat leprosy by many, as it results in the withering and ultimate entire wasting away of the ears. Please inform us as to the nature of this feline disorder, and if it comes from eating scallops.

S.

We are compelled to refer this query to our Long Island naturalists. An affirmative answer would probably be correct in a general way, as the health of all animals are affected, more or less, by their diet, and in this special case disease may be developed.

So many inquiries have come to us relative to the Hampshire Hills, prompted, no doubt, by Mr. Hallock's paper in our March number, that we depart from our usual practice and refer the parties editorially to the advertisement of "Summer Homes" in that section, on advertising page III. of this issue.

The Flight of Birds.

The "soaring of birds," in my estimation, is effected by more than balance of wings, tail and feathers. It is effected more or less, at times, by the "spiral ringing flight." This is hardly perceptible in space, but, nevertheless, takes place, more or less. There must be some slight ringing, to keep the sails full of air or wind, writes a correspondent of *Land and Water*. In the case of falcons following the heron, we see this done at a great pace. We get down wind of the heronry, and wait the return of the heron coming up wind to it. We then loose a pair of falcons, and the sport commences when we see the heron returning. Having singled out one, the heron, on seeing the hawks, mounts at once by "ringing," first having emptied its "bread-basket" of eels and frogs, which are seen coming down out of their unnatural element. When the heron has lightened herself up she goes at great pace, having thus emptied her crop, and the falcons, by a spiral flight, at the same time ringing and soaring in different directions, get eventually above the soaring quarry, which rises between them, all three birds taking different directions, until eventually the stronger birds get above the heron. Without this spiral course the hawks could not go faster than the soaring heron, which in space appears simply mounting slowly, but in reality is going up at great pace. Distance and pace are two impossible problems to solve overhead in an uninterrupted sky where there is nothing to give the eye a chance of guessing what movement, if slight, a bird is making. The motion, unless in such a case as the chase of the heron, being very frequently in various birds, such as kestrels, eagles, etc., not distinguishable, with the exception of the ringing flight, which is always mounting or circling to keep the wings full of wind to sail, whatever pace they require to go. When the hawks get above the heron sufficiently high to strike, having got their wind, the first one ready strikes down at her at the rate of 150 miles an hour, if high enough; but if not high enough, the pace is not so fast, and, according to powers of mounting, the value of the stoop is seen; for when the first hawk misses, the other one is mounting to have its turn, and it is generally the best hawk that takes its time, and does not strike until in perfect command of the flight. But many a time in hawking, "light herons" (that is, herons going out to feed), the hawks have to stoop and stoop, and often get beaten, unless the country is open, with no trees or water in the way. The soaring motion is at times, therefore, impossible to detect when birds are amusing themselves, but, nevertheless, it is there, although not perceived at times; and at other times the slightest use of the turn of the wing upward is only seen with the strongest glass when the bird is "ringing slowly" in a "spiral flight." Without some such ringing motion a bird would not do more than a kite without a string to hold it steady; it would disappear with the wind, unless able to keep itself "cutting" the wind by the most scientific steering we have ever seen, without the smallest perceptible jerk or motion.

Showers of Fishes.

In a back number of the *American Angler* (I forget the date) I saw an article in regard to showers of fish that have been seen to fall from the clouds, or somewhere from the upper regions. The writer gave his theories as to how the fish became thus elevated, one of which was that the eggs were carried there on the wings of birds and hatched out in the upper strata of the atmosphere. I never saw one of these remarkable phenomena, but I have seen the ground literally covered with angle worms after a shower, and heard people say that they rained down from the clouds, but if they had observed closely they would have seen them coming from the ground. Now an angle worm and a fish are not closely related only when the fish has the worm in its mouth. I am so sure that angle worms do not rain down that I will venture to make the assertion that they do nothing of the kind. Would it not be a much more plausible theory that these fish were sucked up in a waterspout from some body of water and carried along by the wind until deposited somewhere on the land. As to their being hatched in unknown space above looks very absurd. XX.

Fish Breeding in the Clouds.

I observe a reference made in the *American Angler* of the 31st January last touching upon showers of fishes, in which it states that science has not yet fully explained the phenomena. This is perhaps slightly incorrect. Several causes have been suggested. Might it not very probably be that fish and frogs which fall apparently from the skies are really bred there? Water fowl, it is known, very frequently carry eggs of fish to great distances, having swallowed them, and in their flight disgorging the same unharmed where they can and do fructify and mature in water over which these birds pass. The eggs of many old fish are very glutinous and readily adhere to substances brought in contact with them during particular times of their incubation. Is it not very probable that not only do these birds convey ova upon their wings as well as in their crops, and when flying at great heights the ova, becoming detached from the wings, may remain suspended in the moist atmosphere, which is quite possible under certain conditions of atmospherical pressure, and that when under development they become too heavy and naturally fall to the earth, as frequently witnessed? When we consider the heavy scoriæ from volcanoes, which is upheld for months at similar altitudes, we cannot but give some credence to such a theory as the above.

Could not some of your readers enlighten us still more upon a topic which must be of interest to all anglers?—"*G. B.*" *in American Angler.*

Dead Alewives in Lake Ontario.

A friend of mine (a naval officer who is connected with the lighthouse establishment) mentioned in my hearing recently that he had often noticed a species of fish in Lake Ontario which, from his description, appears to resemble the cisco or herring, and at certain seasons of the year (the latter part of August, I believe) it would appear in large schools, and frequently individuals would come to the surface, go through a series of contortions, and finally float on the surface dead. This occurred in different localities, so that the cause could not be ascribed to poison. Are you familiar with this, to me, curious demonstration; and, if so, what is it? *G. T.*

The fish referred to are alewives, called by the local fishermen "sawbellies." Their death is generally attributed to starvation, arising from the gathering of them in such immense schools that their food supply is exhausted and death ensues. They are found in all parts of Lake Ontario and in some of the inland lakes, and it seems to be somewhat a mystery as to the manner by which they reach these waters, being originally, at least, strictly a salt-water fish. They make excellent food for the large lake fish, as they seldom grow larger than six or eight inches.

Notes on The Manatee or Sea-Cow.

The manatee, or sea-cow, is becoming gradually extinct in America. One species which was confined to the Arctic seas and most plentiful about Kamschatka, Alaska, has, it is said, become extinct, and it is even claimed that it has not been captured in this century. The only specimen in America is now confined to the Florida coast and south to the Amazon. Along the Indian River* the species was formerly common and is still occasionally seen. Owing to the fact that it inhabits salt water and comparatively open places it is easily followed and taken. I am informed that it prefers lagoons and the mouths of rivers, where it feeds on the vegetation growing in the water; the usual species of grass or seaweed preferred being known as manatee grass. This aquatic grass grows on the bottom of brackish rivers and in the edges of the sea. The manatee (*Trichechus manatus*) resembles somewhat in conformation the dolphin or whale. It is not a fish, but a mammal, and bears young, which it suckles as does the whale. Its flippers and tail make its skeleton in general appearance like the whale, but its skull is of a decidedly different form, and the brain cavity is much larger proportionately, showing a higher development.

Manatees are occasionally taken alive and sometimes exhibited in captivity. The reason that this species is not exhibited in traveling shows of the North is that the animal cannot stand the northern climate—in addition to which the selection of food is a difficult matter. It has lately been discovered that the manatee

* The Indian River is simply a lagoon of salt water separated from the Atlantic by a narrow strip of land over one hundred and fifty miles long.

is quite partial to common larvæ grass of the North, and it is expected that the sea-cow will occasionally make summer excursions to the northern United States outside of large city museums.

One which was captured in Florida last April was taken to St. Augustine, far north of its usual habitat, and placed in a tank and carefully tended in the museum of Dr. J. Vedders. He quickly learned that the animal preferred green cabbages to all the food offered it. This constituted the fare while in captivity, and the quantity of cabbages consumed in comparison to the size of the animal was really very small. Just at the time when the tourist season began, the manatee sickened and died, leaving its owner in the hole, so to speak, for the vegetables from April to December and no returns. This specimen was over nine feet long and weighed about six hundred pounds.

My friend, Capt. John Baird, who sails the length of Florida and around to Honduras, informs me that he frequently met with manatees from Yucatan southward, and that they grow to a length of fifteen feet and quite 2,000 pounds in weight. The flesh is said to be excellent, much like beef, coarse, yet very tender. Unlike the whale, which floats when dead, the manatee sinks when killed, and is frequently lost when struck. It is a harmless creature, never taking the aggressive, and feeding wholly on vegetable growth.

It bears one young at a time, which is nourished from mammal on the breast as in the monkey and bat tribes. Stories regarding the delusive mermaids are said to often take their rise from ignorant and superstitious persons only half observing this creature and drawing conclusions without foundations. *G.*

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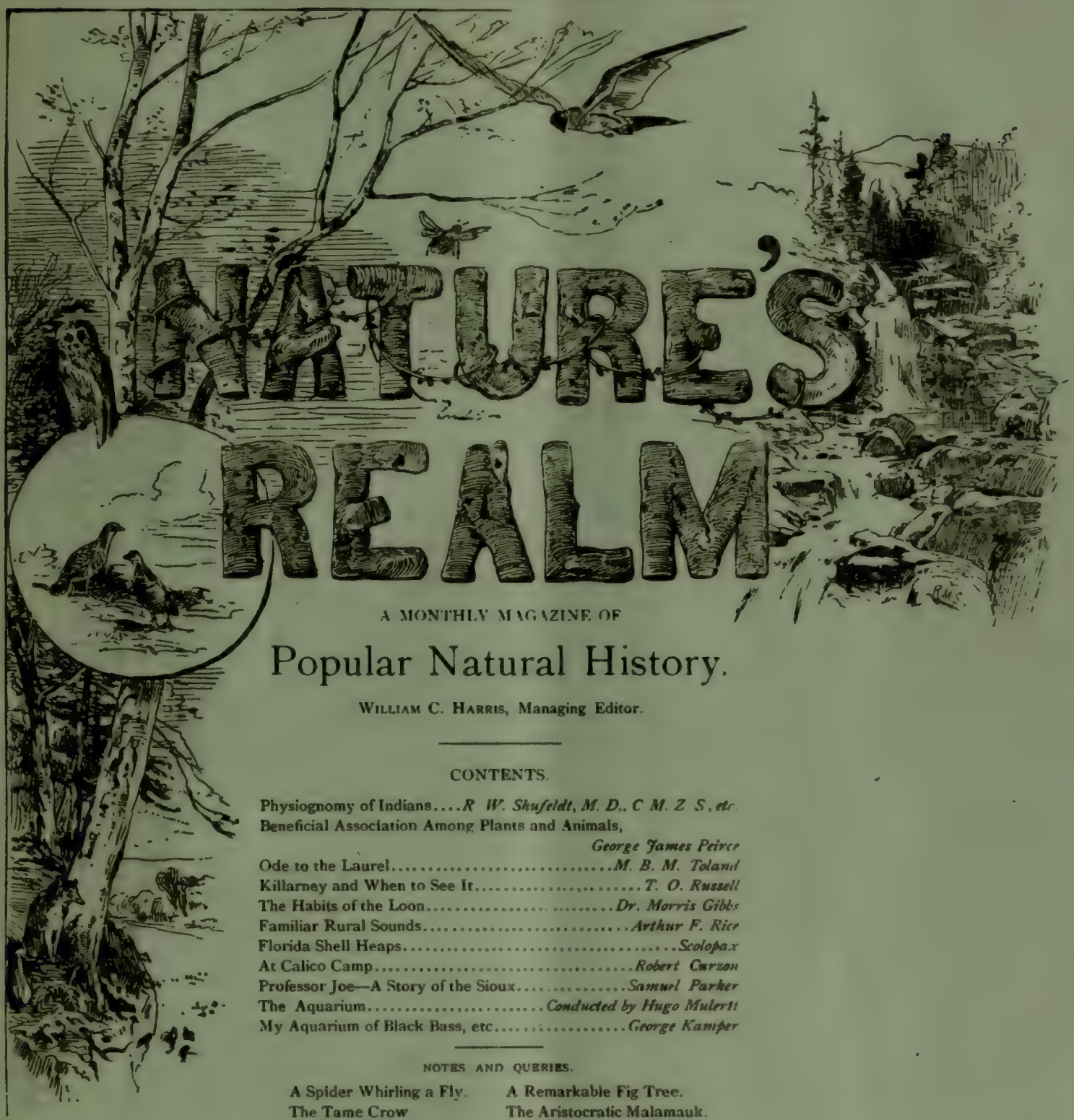
VOL. II., NO. 5. MAY, 1891. PRICE 20 CENTS.

[Entered as second-class matter in the New York Post Office



NATURE'S REALM

A MONTHLY MAGAZINE OF

Popular Natural History.

WILLIAM C. HARRIS, Managing Editor.

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PUBLISHED BY

THE HARRIS PUBLISHING CO.,

10 WARREN ST., NEW YORK

SUBSCRIPTION PRICE. . . . $2.00 PER ANNUM

NATURE'S REALM.

VOL. II. MAY, 1891. NO. 5.

PHYSIOGNOMY OF INDIANS.

BY R. W. SHUFELDT, M. D., C. M. Z. S., ETC., ETC.

[Member Anthropological Society of Florence, Italy, and the Anthropological Society of Washington, D. C., etc.]

Mr. Emerson was a physiognomist of no mean calibre, and his powers of discernment in such matters were excellent; nor did he entirely ignore the more truthful chapters given us in the works of the phrenologist. In his "Conduct of Life" he tells us that "A dome of brow denotes one thing; a pot-belly another; a squint, a pug-nose, mats of hair, the pigment of the epidermis, betray character. People seem sheathed in their tough organization. Ask Spurzheim, ask the doctors, ask Quetelet, if temperaments decide nothing, or if there be anything they do not decide. Read the description in medical books of the four temperaments, and you will think you are reading your own thoughts which you had not yet told." * * * "At the corner of the street you read the possibility of each passenger in the facial angle, in the complexion, in the depth of his eye." * * * "The military eye I meet, now darkly sparkling under clerical, now under rustic brows. 'Tis the city of Lacedæmon; 'tis a stack of bayonets. There are asking eyes, asserting eyes, prowling eyes, and eyes full of fate—some of good and some of sinister omen." And further along in the same worthy work he remarks: "A man finds room in the few square inches of the face for the traits of all his ancestors, for the expression of all his history and his wants." * * * "The sculptor, and Winckelmann, and Levator, will tell you how significant a feature is the nose; how its forms express strength or weakness of will, and good or bad temper. The nose of Julius Cæsar, of Dante and of Pitt suggest 'the terrors of the beak.' What refinement and what limitations the teeth betray!

All this and much more besides by the same subtle thinker may be observed in our every-day studies of physiognomy. But Emerson probably had only the Indo-European in his mind when he wrote what we have quoted from him. His words will apply with quite as much truth, however, to the members of any race, and they apply, as we shall soon see, with especial force to the Indian. When I say the Indian I mean any of our North American Indians. There is quite as much diversity of character among the individuals that represent the various tribes of those people as there is to be found among the whites or Indo-Europeans. And, as character determines cast of countenance, we find an equally diversified physiognomy among them. Some Indians show in their faces more or less intelligence, honesty of purpose, good nature and eveness of temper; others, the moment they look at us, repel and revolt, for their features bear alone the impress of cunning, cruelty and savage depravity. Among the tribes in the Southwest, where they enjoy a sort of crude form of civilization of their own, which has long existed, the physiognomy in many cases becomes still more distinctive. Here other factors come into play to help mould the countenance and to insure its inheritance. Not only has the periodical conduction of war and all that war means, for generations, had its influence in this way, but to this element must be added others.

For instance, many of the Navajos exhibit a genuine taste for the accumulation of wealth and worldly goods. Numbers of them are rich

in the possession of great herds of sheep, and they have a very fair understanding of the value of money and its advantages.

The elements of their civilization and the impress of our own civilization have no doubt produced their effects, and where such factors are most actively at work, and have been applied the greatest length of time, there can be no question that the Indian character has been influenced by those means, and in certain instances we may detect it in their physiognomy.

Those who have ever compared the features of typical representatives of the sedentary Indians with the physiognomic characters as presented in the countenances of similar individuals among the field tribes, cannot fail to have seen the marked differences. People who have lived for ages as have the Moquis and Zuñis in their peculiar, semi-civilized state, must of necessity in time produce a very different appearing class of men as compared with individuals selected from such tribes as the Navajos, already mentioned, or from the even still fiercer Apaches.

As illustrating what I have thus far said I am enabled to present in the present connection the portraits of three very well-known and distinguished Indians, the chiefs of as many tribes in New Mexico and Arizona. The first of these (Fig. 1) is Mariano, the chief of the Navajos, an Indian that I knew personally very well indeed for a number of years. The second is Paliwahtiwa, the Governor of Zuñi, a man of very pronounced characteristics—a person whom I met a number of times, and consequently knew but slightly. Mr. Cushing took Paliwahtiwa east on his tour through New England and the Middle States, where his dignified appearance and carriage at once impressed all those who met him. Finally I present the portrait of Ga-ten-eh, the head chief of the Warm Spring Apaches, and the successor to that unconquerable savage, Victoria, in 1887. His wife and little girl figure in the same plate, and it would be hard indeed to find anywhere an Indian woman with the unmistakable facial indications of a cruel and savage character more distinctly marked. I will guarantee the scalping-knife is not a stranger to her hand, and it may be depended upon that she knows how to use it.

Even to the casual observer a comparative study of the features of these three noted Indian chiefs cannot fail to be an instructive one. Many of the characteristic traits of Mariano are clearly defined in his features. He is a firm, brave, as well as a shrewd man. Cunning to a fault, clear-headed, good-natured, and with it all markedly diplomatic for an Indian in all his transactions either with other tribes or with the whites. On several occasions when I was present at an interview between this chief and the commanding officer of Fort Wingate, New Mexico, called forth by some trouble between the Navajos and ranchmen or soldiers, I was forced to admire the skill with which Mariano presented the case in question and conducted the argument for his side. A number of times men had been killed on both sides, and an outbreak of those Indians would have surely resulted had it not been for the wise conduction of the affair in the hands of Mariano, and his power in the council to control his excited people. He is a Navajo, and a true field Indian through and through. Full of common-sense Indian philosophy; the owner of many sheep; no lover of the Zuñis; simple in his habits, though fond of gambling; and finally, well schooled in the traditional myths and history of his tribe.

What an entirely different visage are we called upon to behold in the case of Paliwahtiwa, Governor of Zuñi. He is a splendid and a typical representative of a sedentary tribe of Indians, a folk that for so many generations have lived huddled together, the life of the Pueblos and all that that means. The Zuñis are practically the remnant of a nation, and, I think, as compared with the Navajos, a non-progressive one. To some extent they are a romantic, almost a poetic people, and tenacious of the myths of their ancestors. Naturally their tastes for agricultural pursuits have been more pronounced than in the case of the Navajos, the more warlike tribe, and their commodious stone and plaster houses have inclined them more toward home life and a love for the domestic. Living so much massed together and in such durable structures, has also brought with it a certain ever-present sense of security from the attacks of outsiders. This also has had its influence, and such traits as

MARIANO, CHIEF OF THE NAVAJOS.

military tact and cunning have retrograded in consequence. and we see not a trace of any such power in the face of Paliwahtiwa; nor do we see there a sign of cruelty, as his countenance is a markedly benign one for an Indian of whatsoever tribe, and indeed there is much expressed in it that would incline to draw us toward the man. We would not be mistaken in him, as he has an eminently kindly nature, and both a personal and national history to tell that is pregnant with ethnological interest.

Paliwahtiwa's sedate visage is by no means lacking in intelligence, and for a Zuñian he possesses no mean grade of it.

The two chiefs thus far noticed are men of about the same age, either being between sixty and seventy years old. I desire now, however, to invite attention to the physiognomy of a much younger man, and one which clearly shows in it all the traits of the tribe to which he belongs, that is, the Apaches.

Ga-ten-eh in 1887, as I have already said, succeeded the well-known Apache chief, Victoria, as the leader of the dreaded Warm Spring Apaches. We find little or nothing in the face of this man that in any way reminds us of the physiognomic characters as we observed them in the faces of either the governor of Zuñi or the chief of the Navajos. Although the Apaches are skilled in many of the simpler arts and industries as we find them among the Indians of the Southwest, we sum up the general characters of this tribe when we say they are a fierce, warlike, cruel, and, in many instances, a brave people. Whatever claims they may have to intelligence, that character is rarely exhibited in their physiognomy; indeed, their faces express but little more than their predominating traits, and therein cunning and cruelty overshadow all else. Ga-ten-eh typifies this cast of countenance, and in his visage we see but the index of a man to be dreaded, and one not to be trusted. His cruel, unrelenting eyes bespeak his savage nature; standing between them is his sharp, aquiline nose, having all the significance of the beak of the falcon, while below are the thin lips of a mouth fully capable of laughing at any form of human torture that its possessor may see fit to mete out to his captive victims.

So far as his general character is concerned, I find nothing to add or to say in favor of this crafty, untamed and turbulent barbarian. Both he and the tribe from whence he comes long checked the progress of Indo-European civilization in Arizona, and in that country the Apaches, as we know, upon more occasions than one, nearly exterminated the early pioneer settlers.

Thus it will be seen that individual Indians not only possess all the various forms of temperament known to us, but also exhibit every imaginable type of character, and they may be specialized by well-defined and dominant tribal peculiarities. The recognition of these facts should be a guide to us in a rational handling of these savage people in the future. In attempting to assimilate them to our civilization, the most we can hope for is to bring about a species of taming. Above all we should, as far as possible, consult their individual tastes, and this is the key to their reconciliation in adopting pursuits so utterly different from anything they have been accustomed to for ages and generations past. It is not in the course of reason, nor in the nature of things, to expect that they all care to become farmers, or those with strong agricultural tastes desire to become soldiers. Numbers of the Apaches could be organized and drilled as an Indian regiment, to be employed only against other tribes when the latter are insubordinate. This applies also to many of the Northern tribes. Many of the Pueblo Indians take naturally to agriculture, but those who have decided tastes in the manufacture of fabrics and pottery should be encouraged in those arts and given better facilities than the crude appliances which alone they now command. Such views simply express my convictions in the premises, and I must believe that a more careful study of Indian character, a better appreciation of certain anthropologic laws bearing upon the question as to what really constitutes civilization, and, finally, time, can alone adjust such important matters.

PALIWAHTIWA, GOVERNOR OF ZUÑI.

BENEFICIAL ASSOCIATION AMONG PLANTS AND ANIMALS.

By George James Peirce.

For more than ten years the interest of biologists has been held by those associations of animals and plants which seem to benefit both the parties concerned. About this, as about all important questions, there has been much difference of opinion, much argument, much ridicule.

It is a matter of no small significance to botanists and zoölogists that organisms which, alone, would find it difficult to succeed in the struggle for existence, are able, by joining their efforts with those of other organisms of very different affinities, not only to survive, but also to attain a size and number far greater than their neighbors.

To the late Anton De Bary, professor of botany at the University of Strasburg, we owe the introduction into the scientific vocabulary of the word *symbiosis*, which means "a living together." He urged that it should be used in addition to, or in place of, the word *parasitism*. In all cases of parasitism one organism lives wholly at the expense of another. When it became evident to the scientific world that there are organic associations which are not in their nature parasitic, the word *symbiosis* was applied to these beneficial unions only. Thus, just as the new field for investigation was opened, a name was ready for it.

That there should be mutual benefit associations among lowly aquatic organisms is indeed remarkable, but it is still more wonderful that the elaborately differentiated organisms of the land should combine into similar associations. The object of all these associations is to improve the chances of both organisms in the struggle for existence. The aquatic organisms are associated in order to secure better food supplies; the land organisms combine for mutual protection against their enemies.

Perhaps the most remarkable cases of symbiosis, or beneficial parasitism, between animals and plants are afforded by certain ants and tropical trees. It is generally known that in the moist, fertile regions of the tropics, those plants whose leaves are tender and succulent are much more numerous than in temperate climes. Various devices are resorted to by the plants in order to protect their foliage; but of these devices the most noteworthy, and at the same time the most interesting, is the maintenance of a standing army of ants.

Travelers tell us that it is not uncommon in the tropics to see a double line of ants stretching from their hill, across an open space, and up some tree trunk. One-half the ants are toiling homeward under heavy burdens of leaf fragments; the other half are hurrying toward the source of supply.

The ants make a two-fold use of the leaves; they eat the soft, green parts; they use the harder, woody parts, the veins and stalks, as the supporting columns of their hills. From such systematic labor more or less complete defoliation of the tree results. Against these marauders, therefore, some defense must be provided, and to this end certain plants are furnished with the means to attract, to hold and to impel honey-eating ants to fight for them.

In tropical America there grows the tall, somewhat palm-like tree, called by the natives the *Imbauba*, and known to botanists as *Cecropia adenopus*. It is rather slender; its hollow stem, divided like the bamboo into chambers or joints, is crowned with large, tender leaves, which are very attractive to caterpillars and to leaf-cutting ants. The contour of the hollow stem is smooth and even, except that, just below each joint in the outer surface of the stem, there is a depression which corresponds with a similar depression of the inner surface. A thin place is thus formed; so each chamber is separated from the outside world by a wall that is thin only in one spot. Through the thin place friendly ants bore readily, and soon find themselves in a cavity of considerable size. Within this chamber they establish a colony. The house grows with the number of its occupants, so that the whole colony is never obliged to

GA-TEE-EH, HEAD CHIEF OF THE WARM SPRING APACHES, 1881.

seek larger quarters. In this way a perfect shelter, easy of access, is provided ready-made for the ants.

The Imbauba furnishes food as well as lodgings to these ants. At the bases of the leaf stalks, amid clusters of hairs, are formed many small, egg-shaped, albuminous bodies. These are the solid food of the ants. Upon various parts of the tree there are glands which secrete nectar. All ants are extravagantly fond of honey, and they will get it wherever they can. Flowers are the commonest source of nectar, but its purpose in them is to attract the bees, butterflies, and even birds which transfer the pollen to the pistils, and so fertilize them. Ants cannot fertilize most flowers, so their taking the nectar would be mere robbery. The floral nectaries must therefore be protected. This protection is effected by the feeding nectaries being situated between the flowers and the tree trunk. The ants get enough honey from these extra floral nectaries to make them willing to let the others alone.

Thus the friendly ants are supplied by the Imbauba with lodging, and both solid food and sweetmeats. Receiving both food and shelter without labor, they have nothing to do but fight. They fight on every possible occasion, and always vigorously and successfully. They attack not only leaf-cutting ants which seek supplies from the trees in which they live, but also the larger herbivorous animals. One can easily imagine how disagreeable it would be for some browsing mammal to have its mouth furiously stung by a lot of ants which it had taken in with a mouthful of leaves. A few experiences of this sort would be sufficient to teach it to beware of garrisoned trees.

That this defense is equally effective against men is shown by an incident which Mr. Belt, a traveler in Nicaragua, narrates. Mr. Belt says that he doubted that ants could drive off a man who was determined to climb an Imbauba. He therefore offered an Indian lad a small sum if he would climb one of the trees. The lad unhesitatingly refused to try, and so Mr. Belt raised his price. Finally, after he had made what he thought was an extravagantly liberal offer, the boy consented to try. A tree of a size convenient for climbing was selected. The boy climbed well for fifteen feet or thereabouts, then he stopped, and in a moment dropped to the ground all covered with small fiery-red ants that were stinging him pitilessly. He could not rid himself of the creatures except by jumping into the stream near by.

Other tropical trees maintain similar garrisons, quartering them in thorns or other hollow parts. That these armies are indispensable to the perfect development of the trees is shown by the statements of Prof. Schimper, of Bonn, and confirmed by other travelers in Central and South America. Prof. Schimper says that, during his stay in tropical America, he made it one of his chief objects to find a well-grown Imbauba which had no ants in it. He failed to find a single tree. He did see, however, that unless the trees were garrisoned when they were very young, they fell an easy prey to their enemies. He found many young trees which were more or less bare of leaves. These had no ants in them. Other trees of equal age, which were tenanted, were apparently flourishing.

Yet certain men of science say that it is foolish to believe that ants are ever provided by a tree with board and lodging in return for doing a little fighting for them once in a while. They say that, since the hollow places existed in the trees, the ants simply appropriated them, and that they would naturally object to an Indian lad shaking their nests down about their ears, or to a swarm of hostile ants scrambling about and chewing the leaves.

They ask, also, if they themselves should be any better off if they had to feed a lot of hungry creatures. Yet in feudal times each petty baron fed and housed his retainers without complaining, just because they did a little fighting for him once in a while. We are living in a time when our struggle for existence seems peaceful, when men fight no longer with swords and spears, but with pens and mining stocks. Unfortunately the lower organisms, both animal and vegetable, have not reached this pleasing state, and even now each creature tries either to kill or to make friends with every other.

If a plant can, at the sacrifice of some nectar and albumen, save its life and propagate its

kind, it is gaining an advantage over those plants whose leaves are all devoured as soon as they appear, or are so contracted in surface, and made so hard and woody in order to be unattractive as food, that they fulfil only half their functions. If, by providing a lodging place also, even at some inconvenience to itself, a plant can secure the entire services of a defensive army, it will be safe by night and by day.

The skeptics admit the benefits to the ants. If they admit the benefits to the protectors, they must also admit the benefit to the protected.

ODE TO THE LAUREL.

By M. B. M. Toland.

Thou emblem of eternity!
  Born from thy aged trunk, all gnarled and sere,
Arise thy scions from the parent tree,
  And clothed in verdant foliage, appear
Like sacred monuments to Grecian age.
  As Spartan sons sprung from heroic sire,
Proud of his fame enrolled on glory's page,
  To higher deeds of chivalry aspire,
So they in youthful strength arise, expand,
  Though parent root be crumbling to decay,
And in hereditary beauty stand,
  As thou didst stand in springtime of thy day.
Time will roll on; gray moss and lichens grow
  Where now thy shrunken, wrinkled form appears,
And they that stately stand, be bowed as low,
  Be weather-shattered, wasted, worn and old,
Yet shall not wholly die; their germs will be
  Renewed, uprising from incrusted mould,
Immortal type of immortality.

Italian myrtle wreathed in chaplets green,
  The ardent votaries of love may wear,
And worship Aphrodite, beauty's queen,
  Their homage oft rewarded with despair.

Let festive roses blush when zephyrs kiss,
  And wantonly to all their fragrance yield
That seek the unrestrained ambrosial bliss,
  Nor heed the thorns among the sweets concealed.

Let purple grape with leaflets of the vine
  The orgies wild of Dionysus crown;
Let garlands gay the fevered brow entwine
  When maddening joy their sodden senses drown.

Love, pleasure, revelry, will pass away,
  In long oblivion lost and withered lie;
All chaplets save thy own, immortal bay!
  The wearer of thy crown shall never die.

KILLARNEY AND WHEN TO SEE IT.

By T. O. Russell.

The great fleet of ocean steamers will soon be taking thousands of Americans over the Atlantic to enjoy the mild summer and varied scenery of Europe. Most Americans who go to Europe in search of the picturesque come back to their native land disappointed, although it may be wiser. Those in search of the beautiful do not need to go outside of this continent to find it, but it would seem that no matter what new places of scenic interest may abound in America, its wealthy classes are not satisfied with them, for the annual exodus over the Atlantic is ever increasing in volume.

Great Britain receives a large share of the wealthy American tourists, but Ireland, in spite of the fact of its being the nearest part of Europe to America, receives only a comparatively small part of them. They hasten on to the continent, Switzerland being the bourne for which most of them aim. Notwithstanding the fact that Ireland is the nearest part of Europe to America, it is less like America in a scenic point of view than is any other part of the Old World. A native of almost any part of the Mississippi valley, were he transported to the steppes of Southern Russia or to the banks of the Loire or the Elbe, would not notice any very marked difference in the aspect of the country from the land in which he had been raised; but the American who visits Ireland for the first time will find himself in a country so strange in aspect and so unlike his own, that he will imagine he is in another planet instead of on the other side of the Atlantic.

Except some favored spots in Switzerland or France, there is no spot of European soil more famed for beauty than Killarney. Its very name is beautiful, as any one can know who has heard Balfe's grand song, "Killarney." No sounds more harmonious or more fitted for a refrain could be uttered by the organs of speech. The name signifies in Gaelic, the church of the sloe or wild plum tree. The real name of the lake, or chain of lakes, which is the great charm of Killarney, is Loch Lein, but the latter name is now almost obsolete.

Before attempting to describe Killarney, it will be well to give the reader an extract from Macauley's "History of England." The passage is a masterpiece of prose. It is a sketch of the scenic characteristics of that part of Ireland where the famous lakes are situated:

"The southwestern part of Kerry is now well known as the most beautiful tract in the British Isles. The mountains, the glens, the capes stretching far out into the Atlantic, the crags on which the eagles build, the rivulets branching down rocky passes, the lakes overhung by groves, in which wild deer find covert, attract every summer crowds of wanderers sated with business and the pleasures of great cities. The beauties of that country are often, indeed, hidden in the mist and rain that the west wind brings up from the boundless ocean. But on rare days, when the sun shines out in all his glory, the landscape has a freshness and warmth of coloring seldom found in our latitude. The myrtle loves the soil; the arbutus thrives better than in Calabria; the turf has a livelier hue than elsewhere; the hills glow with a richer purple; the varnish of the holly and the ivy is more glossy, and berries of a brighter red peep through foliage of a brighter green."*

Macauley, in spite of his Celtic name, was a fierce hater of Ireland and the Irish, and there is no reason to suppose that the above most wonderful word-painting was evoked by any liking for the land it describes.

The American who expects to find the grandeur of the Rocky Mountains in Killarney will be wofully disappointed. The entire area of the beauties of Killarney is hardly more than ten or twelve miles square. It could be ridden round in a day. The most wonderful of the many wonders of Killarney is the variety of scenery in so small a compass. In this respect no other part of the known world can compare with it. Every possible phase of Nature, everything she could do with land and water, can be found in Killarney, and found on a little spot of earth hardly as large again as Manhattan Island. Mountains, lakes, rivers, rocks, woods, waterfalls, flowery islands, green meadows and glistening strands, almost exhaust Nature's

* History of England, Vol. III., p. 107.

THE LAKES OF KILLARNEY.

materials for forming the beautiful. But all are found at Killarney. Man, who mars Nature so often, has helped her here, for the castles and abbeys he raised of yore still stand, and their ivy and flower-decked ruins, tenanted only by the bat and the bee, put the finishing touch on this earthly Eden, and make it one of the scenic wonders of the world.

Another wonderful thing about Killarney is the admirable proportion that its scenic features bear to one another. If the mountains were any higher they would be too high for the lakes, and if the lakes were any bigger they would be too big for the mountains. Even the rivers and waterfalls are in almost exact proportion to the other phases of Nature. The monstrous Mississippi or the thundering Niagara would spoil such a miniature paradise, but the limpid Laune and O'Sullivan's babbling cascade suit it exactly. Killarney is the most perfect effort of Nature to bring together without disproportion all her choicest charms.

Small as Killarney is, it would take at least a week, or perhaps two weeks, to see it and know all its loveliness. It is only on foot and without hurry that its beauties can be seen in perfection. Its mountains may be ascended and glorious views of sea and craggy heights obtained; but the charm of Killarney is not grandeur, but beauty. There are mountain views in America finer than can be had from the summits of Mangerton or Carn Thual. It would be waste of time to climb those hills. Let the tourist rather wander in the hundreds of shady lanes or paths that skirt the lakes, or take a boat and navigate that most picturesque river, for its length, in the world, the Long Range, that connects the upper with the lower lake. Let him mark the wondrous luxuriance of grass, leaf, weed and flower. The arbutus grows so large that it becomes a tree. Ferns of such gigantic proportions may be found in shady nooks that they seem to belong to some far-back geological age. Softness, freshness, luxuriance and *beauté riante* are the real glories of Killarney. In these it has no rival.

There are two drawbacks to Killarney; there is the guide nuisance and the rain nuisance. The nuisance of guides is probably no greater than in many other places of tourist resort, and, by a strong effort of the will, can be got rid of. But the rain is a more serious matter and must be borne patiently. Some years come when not a dozen dry days occur throughout the entire summer, but generally there is no greater rainfall than on the west coasts of Scotland or England. There have been quite as many wet days in New York during the three last summers as there usually are in Killarney. It does, however, too often happen that tourists are confined to the hotel for four or five days at a time, owing to the rain. It must be borne in mind that this excessive moisture of atmosphere is what has given the southwest of Ireland, and England, too, their exquisite charm of verdure and wild flowers. When a fine day comes after rain in summer or autumn, all Nature seems to laugh. Flowers of all hues open their petals; birds in multitudes begin to sing, and wild bees and hosts of insects make the air musical with their hum. The American tourist need have no fear when insects are mentioned, for the mosquito is unknown in Killarney. Midges are the only insect plague, but they never enter houses, and are troublesome only before rain, early in the spring or late in the fall.

Most tourists go to Killarney early in the summer. June and July are favorite times for Americans to visit it. As it lies almost in the direct route between New York and Liverpool, they generally visit it before going to England or the continent of Europe. But the time to see Killarney is in the autumn; it is then in all its glory. It should not be visited before the 15th of August; from then until the 1st of October it is the most beautiful place, perhaps, on earth, provided, always, that the weather is not wet. There is only one thing that mars the weather in the south of Ireland, namely, rain. Cold, in the American sense of the word, is almost unknown. Every day that is not wet must be fine. There is, it must be confessed, rather more probability of having dry weather in Killarney in the spring or early summer than in the fall, but, by visiting it in the spring, the tourist would gain nothing, and would lose the wild-flower feast of autumn. No American, no matter from what part of the country he comes, can form the faintest conception of what a Kil-

larney mountain is in September, if the weather be fine. The wildflower that is the glory of Ireland is the heath. It blossoms only in the autumn. Next in glory to the heath comes the furze. Both furze and heath are unknown in this country. They are indigenous in the whole of the southwest of Europe, but, owing to the mildness and moistness of the climate of Ireland, they grow and blossom there with a luxuriance unknown in any other country. The heath bears a flower of the most delicate purple, and the furze bears one of the brightest yellow. When a great mountain becomes a mighty banquet of purple and gold, a sight is revealed which surpasses anything else on earth in floral beauty. Almost every mountain round about the "Eden of the West" is clothed from base to summit in a vast drapery of heath. Some of the Killarney mountains are wooded for a few hundred feet up their sides, but most of them are entirely covered with heath interspersed with furze. When a fine autumn occurs, tens of thousands of acres of mountain and moorland gleam in the sunlight, an ocean of purple heath and golden furze. Not only do the heath and furze blossom in the autumn, but myriads of other wildflowers appear only at that time of year, or blossom most luxuriantly then. Even white clover, which rarely blossoms in this country except in the spring or early summer, opens its flowers widest and sends out its most fragrant perfume in an Irish autumn. The air is heavy with the fragrance of flowers; the mountains are musical with the hum of bees, and

> Every wingèd thing that loves the sun
> Makes the bright noonday full of melody.

Killarney in a fine autumn becomes not only entrancing, but overpowering in its loveliness.

The whole country round Killarney is a wonderland. Macauley's description of it is true to the letter. In all his works nothing can be found of a descriptive character equal to the passage quoted from him in this article. He had a great subject, and he has handled it as no other writer of the English language could. He has described one of the loveliest regions in the world in a few lines that will stand forever as one of the greatest efforts of a great writer. His description is a brilliant gem of composition, just as the place it describes is a brilliant gem of Nature.

No one should visit Killarney without visiting Glengarriff. It is only about twenty miles from Killarney, and can be reached by a sort of low-backed car peculiar to Ireland. This car is a very curious sort of conveyance. The occupants sit back to back, with their sides to the horses. In fine weather there is no pleasanter mode of traveling than on a low-backed car, but when it rains, one is anything but comfortable. Glengarriff is thought by some to surpass even Killarney in beauty. It is a deep glen surrounded by mountains of the most fantastic shapes, clothed with a wealth of foliage that would astonish any one who had not seen Killarney. The lake that is seen at Glengarriff is sea water, and opens into Bantry Bay. The tourist will find an excellent hotel here, and no matter how he may be satiated with the beauty of Killarney, he will see other and more striking beauties in Glengarriff.

Killarney is well supplied with hotels. There are five or six, and they are all good. Most of them are situated in sequestered places, where a view of some enchanting scene spreads before the door. The village of Killarney is about a mile from the lake; it is a place of no interest at all, but there is a very good hotel in it, and many tourists stop there, for it is just at the railway terminus. Hotel expenses at Killarney in the tourist season are not so dear as at some of the fashionable American summer resorts. They will not average over four or four and a half dollars a day, and, by the week, not more than twenty or twenty-five, including servants' fees. Guides are not much wanted, unless mountains are to be ascended. Then they are indispensable, for mists may suddenly come on the very finest day, and the tourist without a guide would run a chance of spending a night on a bleak mountain, or being drowned in a lake or bog-hole. Ponies of a most docile character can be hired cheap. Pony-back traveling is a favorite mode of "doing" Killarney, especially with ladies and lazy men; but no one into whose soul the charm of Killarney really enters would think of traveling through such lovely scenes on horseback. On foot or in a boat is the way to see Killarney.

THE HABITS OF THE LOON.

By Dr. Morris Gibbs.

There are three birds which are known to bear the title of loon; they are the black-throated diver or loon, the red-throated species and the common loon or great Northern diver. The first two mentioned are not taken within our bounds during the larger portion of the year, and are eminently Arctic birds, breeding from our northern confines to the Arctic circle. The common loon, known so well to hunters, is scientifically recorded as *Urinator imber*, and its habitat ranges over nearly the whole of North America from the Mexican border. It ranges in winter well to the south, but is only found breeding along our Northern boundary and in elevated sections in the mountainous regions of the West, sometimes well to the south.

The common loon is a well-known bird to those persons who have their eyes open for observation of the creatures of lakes and rivers, but to that class who never observe either on land or water and do not study our birds and mammals, he remains a shrouded mystery, even where he is actually abundant six months of the year. Considered from all points, for its peculiar ways in the water, remarkable anatomical structure, curious breeding habits and astonishing call notes, or song, if you wish to call it so, this bird of great swimming and living powers is one of our most interesting species. Carefully observed, the habits will be found so very odd as to command our strict attention, and our admiration will increase as we endeavor to comprehend peculiarities and get acquainted with this singular species.

The loon is quite variable in its vernal appearance in this locality (Michigan), sometimes appearing in late February and again not till after March 20. It is often observed swimming about in the open spots in the rivers in early March, and before the lakes have been freed from the ice. It is occasionally found consorting with the red-throated diver or loon (*Urinator lumme*) just previous to the departure of that Arctic species from its irregular winter sojourn with us. The two species do not probably associate from motives of companionship, as the common kind is hardly ever met with in more than twos or threes, but they are probably brought in contact with their more gregarious cousins from the fact that good fishing grounds are scarce in early March, when the lakes are usually frozen solidly, with few exceptions. Several times it has been the pleasure of the writer to observe the two birds together on our streams, and witness their points of difference and peculiarities.

The great Northern diver is generally as abundant as it will be during the season by April 15, as it is believed that migration north has ceased by that time, and that all birds in Michigan have decided on their breeding ground for the season. That the birds are mated on their arrival seems probable, as the same pair is known to occupy the same nesting site or its immediate neighborhood for many years. In cases where three or more birds are observed in proximity on the same lake, there is occasionally evidence of dispute, but the retirement of all but a pair soon occurs, and then the lucky swain and mate are left in undisputed possession of the pond or lake. On larger lakes it may occur that two or more pairs of birds are occasionally found nesting, but in this locality never more than one nest is found on a body of water. Many pairs rear their young on ponds of from ten to a hundred acres extent, the old birds seldom feeding on the pond where their nest is placed to any extent, but seeking their finny prey on larger lakes near; in this way their nesting sites are difficult to find, and remain safe from invasion by egg collectors. Several pairs of birds may be found feeding on one large lake without a nest of the species being found in its area, and this, too, at a time when nesting is in progress, thus showing conclusively that the birds often seek their food away from home.

About May 10, or rather earlier, the nests are generally begun, the first evidence of a selected site being the devotion exhibited by the prospective parents to a particular portion of

the lake or pond. The choice about here is generally from twenty to forty rods from the edge of the water, and varies from this up to a half mile, and is always dependent on the depth of the shallower water. The loon is pre-eminently an aquatic species, and never attempts trips, however short, on land, or even through mud and water. It may well be doubted if this bird could move with anything but the slowest and most painful efforts over a rough, dry surface. A bog, well out from the margin of the lake, an old muskrat house, or one of those peculiar formations in some lakes found rising from the bottom, which is evidently of vegetable matter but difficult to account for, for the basis of the loon's nests. On this foundation, bog or levelled rat's nest, is spread more or less vegetable material, mainly of dead aquatic plants. The bulk of the substance is soft and pliable, and of the nature generally of matter usually found at the bottom of edges of lakes and ponds. Elevations and dryness seem unnecessary to the loon's idea of housekeeping, and they select, contrary to the advice given in the good book, the very lowest place actually above the surface of the water to be found. The rains may come and the winds blow, and still the loon cares not, even if the eggs are partially submerged. She sets with the greatest patience, awaiting the day when she shall be rewarded for the labor of love which instinct or reason dictates. I cannot assert from positive proof that the eggs hatch after being partially submerged, as my cupidity has never allowed me to leave the eggs to hatch as an experiment, the discoveries of nests ever remaining fortunate ones to collectors, the eggs being valuable, and all oölogists are avaricious. It is reasonable to suppose that eggs, even if one-half submerged, will be hatched, and it may be added in support of this that young birds have been observed in the immediate vicinity of deluged nests lately occupied.

The nests, or more properly, depressions, for that is all there is to them, are oblong in shape, being twenty inches long and twelve to fourteen wide. The shape is to accommodate the peculiar long body of the bird. The eggs are placed at about two-thirds of the distance from the front of the nest. To be more explicit, the eggs are placed well back from a centre, in order to receive the warmth of the mother's abdomen. The eggs, two in number, lie side by side in this oddly shaped nest, and from their position one can always tell which way the bird sets when on the nest. The bird invariably sets with her head out to sea, as we may say; in other words, she always faces the deeper water, where she can see danger on either side and in front. At the slightest evidence of danger the loon pitches forward into the water with greater celerity than would be expected, and reappears only after swimming from fifteen to twenty rods beneath the surface.

Perhaps no bird possesses better ability to avoid the danger from the rifle and shotgun than the loon, and it is to be doubted if there is any bird on American soil which can dive so quickly or remain under the water as long as he. Every hunter north of 35°, north latitude, has had some experience with the loon, and all can testify to his crafty ways and numerous—we might say almost invariable—escapes. Only one way seems in any degree fairly sure of success in his capture, and this procedure frequently fails; it consists in getting the loon between fires on a stream or narrow lake. When so hunted the loon gets rattled, so to speak and as the boys call it, and is generally keeled over. It is no wonder the poor fellow becomes crazed and loses his head; how many land loons would fail as well? And yet I have seen a loon surrounded on a small mill pond, with not a ghost of a chance of escape by flight, keep a dozen shooters firing for an hour before it succumbed to the inevitable. When fired at, the great northern diver always dives to avoid danger, and never attempts to escape by flight. The attempted harrassing of a loon by a whole flotilla does not seem to worry him at all, and he escapes in as easy a manner as if from a simple scow. It is not alone the loon's knowledge of his ability to escape by diving that causes him to adopt that means for safety, but as well his knowledge that he makes a first-rate mark for the gunner in his cumbersome efforts at taking wing from the water. After a careful review of the flights of birds, I think it fair to accord the loon the lowest place in the scale, in his efforts at rising from pond

or stream. Of all clumsy undertakings, the attempt of a loon to fly from the surface of the water is the poorest excuse. He cannot spring into the air as do many of the ducks, but starts apparently with an effort at running on the water, making a great splashing and churning the water into foam. The wings are vigorously beating, and after a dash of two or three rods the body is fairly out of the water, but the tips of the wings beat the surface for at least six to ten rods more before the bird fairly flies. At least a space of ten rods is covered between the beginning of the rush through the water and the time when the body is clear from the surface by a foot.

I have heard that a loon could not leave a pond of ten rods in diameter, from his inability to rise above the borderiug bushes around the pond, and I believe it fully. It will cause many to speculate and wonder why the loon could not go in a circle about a pond, and thereby gain the necessary elevation; this would seem practicable, but, so far as my observations go, the loon seems incapable of advancing in any but a straight line. It would be interesting to learn from careful experiment if one of these birds was incapable of leaving a very small pond.

The loon lays invariably two eggs at a clutch, and these are deposited from May 10 to June 1 in Michigan. They are from three and a half to four inches long, by two to two and a half inches in their smaller diameter. The color is generally dark and of an olivacious brown, but sometimes of a drab color, spotted and marked with darker brown. They are handsome, and form a great addition to an egg collector's cabinet. There is an interval of two days between the depositing of the eggs. The period of incubation is well over three weeks.

The young, on their appearance, take immediately to the water, swimming and diving in a manner to convince one that the water is their proper home from the first. They quickly learn, under the tuition of their parents, to conceal themselves, and in addition to this are also taught to ride on the back of their mother. It is most interesting to observe the movements of a family soon after the young appear, and it has been my good fortune to twice observe them. Nothing could appear more appropriate than the perching of the young ones on the broad back of the parent, presumably the female, and in this position I have observed them with great interest as they rode about with perfect security, propelled by the tireless paddles of the old bird.

When the old bird apprehends danger she dives, and the little ones disappear with her. It was natural enough that the young should attempt to follow their parent's example, but after hearing that the young ones reappeared with their protector, I was convinced that the old one must in some way aid her offspring in their flight, as we may call it, through the water. The good fortune came to me at last to witness a part of the performance, that portion that mortals are allowed to see. An old bird, accompanied by two young, was seen in a little bay on the lake, and we hastened to press her to dive, hoping to secure the young for examination after they were left alone. When first observed the young were at some distance from the mother, but were quickly brought to her by a warning deep, stridulous note, when she observed the approaching boat. She then lowered her body in the water, and the young loons quickly secured a position on her back. We now rowed rapidly, when the old bird dived, and we distinctly saw the young disappear likewise, each chick evidently having seized hold of the feathers of the mother's body, presumably the tail feathers. It is fair to say that the tail feathers are the ones selected as tow ropes by the young, as the little fellows were relatively in the same positions at the old bird's rear when they came up. At least it is fair to judge that the young catch hold of the feathers of the old one to facilitate removal from places of danger.

The expressions, "to laugh like a loon" and "crazy as a loon," are well known, and both come undoubtedly from the weird, uncanny call notes so often heard from the borders of our Northern lakes. These notes often sound much like laughter, and one could readily imagine that only an insane person could be laughing in the night out on the lake. The expression, "silly as a loon," is not so easily accounted for, unless one calls the notes foolish; to me they are soul-inspiring and grand. At

any rate, the loon cannot be called a foolish or silly bird, and those who have ineffectually tried to shoot one will be willing to acknowledge this.

To me the notes of the loon are ecstatic music, as heard on the lake when fishing, or on shore as one sits near the glorious camp fire, and they come quavering across the water. The sound of the common notes are *cloo loo loo loo*; there are also notes much like *koawhee loo loo*, which are not so commonly heard, and are more particularly uttered during nesting season. Aside from these efforts, they have a call note uttered by both sexes, and best described by *qui ho*. This call can be so closely imitated by a friend of mine that the birds will answer him at once. These notes are all so weird and unearthly that timid persons often imagine that their origin is from some carnivorous beast or by a horde of savages. In addition to these cries or songs we often hear guttural chucklings and weird whinnyings difficult or impossible to describe, and of so varying a nature as to make it seem that a large number of birds of different species must be tuning themselves on the lake, and not alone one pair of loons.

Anatomically the great northern diver presents several decided peculiarities, among which the most prominent is the position of the feet, which are set at the extremity of the body, and are so arranged and formed as to admit of the greatest power in locomotion in the water. The body is formed to perfection for an aquatic existence, and everything conforms to the needs of the bird in its efforts to secure its food, which consists almost entirely of fish. The loon is not necessary to the fisherman, and is rather a source of annoyance through its ichthophagous propensities, but, in filling a proper position in the economy of Nature, it undoubtedly holds a right to fish in waters of our lakes equal at least to the rights of aggressive man.

FAMILIAR RURAL SOUNDS.

By Arthur F. Rice.

Dwellers in cities have to tolerate, if not to love, the sounds of brawling traffic; the rattle of horse cars and rumble of beer wagons; the puffing of engines and the screaming of steam whistles. In these noises they are pleased to recognize energy, progress and thrift, and very properly consider them the exponents of bustle and activity, and the legitimate accompaniment of our money-getting proclivities. But these are artificial sounds, and neither appeal to our emotions and sensibilities nor have power to elevate and soothe our minds. Natural sounds, like natural manners, are best, and the city is not the place to hear them. The throat of the city sparrow seems choked with dust. The oriole and the thrush need purer air and less noisy competition in order that they may properly express themselves in song. There are few sounds to which we are more pleasantly susceptible than that of moving waters; but the surge of the traffic-stained tide against decaying piles and malodorous docks can never convey to us the same meaning that comes with the musical drip and spatter of a forest cascade, or the whimpering of a meadow brook, where

> "Silver sands and pebbles sing
> Eternal ditties with the spring."

In the town a thousand discords greet the ear. Above the din of machinery, the strident saw and the clanking cog-wheel, one may hear the groan of whipped horses, the beggar's cry, the yelp of dogs kicked from the door, and the savage words of men in strife with each other. In the country a man may wander all day through field and forest and never hear a sound more harsh than the rattle of the kingfisher or the tapping of the woodpecker.

Winter's reign in the country is a quiet one, for snow is a universal muffler of sound, and as there is less for our eyes to see, so there is less for our ears to hear; but there is a sort of robustness and virility in such sounds as do come to us. The winter birds are a hardy race, and there is independence and self-reliance in their calls. The bluejay's clarion note is a defiant challenge to the cold. The crows, too, disdain to seek the luxury of a warmer clime, and change their voices no more than they change their coats under northern skies. The snow birds, it is true, have the gentle twitter of their summer cousins, but they seem the natural accompaniment of the fresh, soft snow, and their complacent notes of greeting seem to indicate that they are on the best of terms with Jack Frost.

The merry jingle of the sleigh bells and the creak of polished runners on the hard, dry snow, are winter sounds dear to the country-born, recalling many a drive over the white-mantled hills. From the open doors of generous barns along the road comes the tune of the flails upon the threshing floor, and in the forest near at hand the ring of the woodman's axe is heard. And now there comes up from the valley a sound which sends a thrill to the sportsman's heart; faint at first and far away, ceasing and then heard again in fuller cadence, the music of the hounds! Who with a drop of hunter's blood in his veins can hear it and not yearn to be on the "runway," with a chance to stop that wild and graceful courser, the red fox, in his flight? What matters the cold, though the trees, "keyed up by the frost," snap and crack in the winter air, and the wind whistling through the hemlocks sifts down the snow into our faces?

There is one winter sound not often heard, and still less frequently understood, namely, the rifting of the frozen earth under the tremendous tension of the contracting cold. It is like a subterrene clap of thunder, muffled but startling, jarring like an earthquake, and leaving a big crack in the earth, which gradually closes up in the spring as the ground thaws out and is expanded under the rays of the sun. The voice of the pine tree, always sad, is even more so in winter than at other seasons. Who shall translate its mournful meaning? What has it been sighing about for a thousand years? Shall we manufacture a little mythology, and say that some earthly maiden was sought by the gods and evaded them by turning herself

into a pine tree, to mourn for her true love evermore?

Those who dwell in a rugged country, on the outer hem of the wilderness, so to speak, hear certain wild sounds that never greet less favored ears—the bark of the fox, the quavering call of the raccoon, and the blood-curdling cry of the panther screaming at night in the mountains. Thoreau says that, "generally speaking, a howling wilderness does not howl," but perhaps he had never heard that awful wail of the panther, shuddering through the hills like the cry of a lost soul.

With the advent of spring all Nature becomes vocal. Up from the marshes and lowlands comes the cricket-like call of the hylas, a plaintive, soothing sound, and yet one that stirs us unaccountably. It calls back to life thoughts that have been dead a year, reviving in our sluggish brain recollections of other spring days long since gone by, with all their precious associations. No man's memory is adequate to the calling up of the past by his own volition, either by following through consecutively the events of his life or attempting to group them. Little fragments of his past existence would be lost to him but for such reminders as the odor of a flower, the sight of a once familiar object, or a sound for a long time unheard.

Almost before the spring arrives, while the snow lies in drifts along the fences, and every hollow in the meadows is a grassy lake, there comes a sound which makes us stop and listen, and thrills us with a glad surprise. It is the voice of the bluebird, the pioneer of the returning songsters. How we welcome him, the pretty wanderer, "shifting his light load of song from post to post along the cheerless fence." Others may sing more sweetly and wear more splendid clothes, but he comes first and gets into our hearts before his tardy followers arrive. If he were—as perhaps he is—a messenger from God, and took his azure tint from the infinite blue through which he came, he could not be more gladly received or bring to us a purer pleasure. "Sweet harbinger of spring!" May thy courage never be less, and may our northern winds ever blow gently upon thee.

When the robins come we feel as if it were ime to bestir ourselves and begin our spring work. Of all the feathered tribes they seem most to partake of our every-day life. Industrious, democratic, fearless, they take up their abode with us as a matter of course, building their nests under our very noses, and hopping about our lawns with a confidence that comes of assured possession. In the matin hymn of the birds they take a leading part; when the others are silent at midday we still hear their soft cluck, and at eventide, from the tops of the tall trees, with heads uplifted and with thoughts far above the dull earth, they pour out their song of thanksgiving.

Soon our ears are greeted with the full chorus of bird voices. From the cool and shady recesses of the forest, where he loves to sing, comes the thrilling music of the wood thrush, and after each April shower the jubilant catbird relieves his soul of its burden of song. From the remote thicket issues the cuckoo's soft, penetrating croak, and the boom of the night hawk is heard in the land. High in air the "sky-swung" hawk utters his piercing cry, and rippling over the fields comes the long, melodious call of the yellow-hammer. Distance softens harsh sounds into harmony, and the barking of dogs and the tinkling of the cow bells far within the wood, is music to the ear. Even the crickets chirp in harmony, and what would otherwise be a blur of sound becomes a rythmical ticking that soothes rather than disturbs. "Sugar is not so sweet to the palate as sound to a healthy ear," and he who is quickest to discern and interpret it, who loves the song of the bobolink, the wild cackle of the great black woodpecker and the hum of the bees among the apple blossoms, has a source and supply of enjoyment that money cannot buy. He who listens well will discover a striking succession of sounds in Nature, one fading into another as time goes on. After the peep of the hyla comes the trump of the bullfrog, and later on the trill of the summer toad. If our hearing were keen enough we could perhaps have heard the lisp of the polywog first of them all. The z-z-zing of the locust, with its crescendo and diminuendo, precedes the din of the August piper, while that in turn is followed by the chirp of the cricket, and, last of all, the rasp of the katydid.

Most summer sounds are soft and subdued. The dense foliage at that season deadens and tones down the murmur of winds and waters, the birds are less vociferous, and all Nature seems inclined to be indolent and drowsy. The quiet is occasionally broken by the muffled thunder of wheels on the wooden bridge or the rumble of a flock of sheep stampeded in the dry pasture. In the edge of the woods the young crow is taking his first lessons in articulation, and from the top of the tall elm the veery sings his soft summer song, which has a spiral sound, and is as sweet as if bored in sandal wood with a golden gimlet. The flies buzz idly about, and the lazy drone of the locust slowly runs down as if he were about going to sleep. Almost the only sign of activity is the distant monotony of the mowing machine, now borne strong and clear on the breath of the breeze, now dying away as if it had gone behind a hill or down into a valley. The surface of the river is smooth as a mirror, and the silence is broken only by the skurry of a fish among the lily-pads or the plunge of a turtle that has been basking in the sun. The voice of the little stream that gurgles through the meadow is well nigh hushed by the tall grasses through and under which it finds its way. There is fulness of life everywhere, but, next to the silence of midwinter, the late summer days are the quietest of the year.

With the coming of the early frosts there is another period of bustle and animation. The birds congregate and gossip concerning the long journey they are about to take. From the groves of hickory and oak comes the bark of the gray squirrel and the "snickering" of his red relative. As we walk through the fields early in the morning there is a musical crash of the thin ice under our feet where each little hollow or hoof mark in the mud of yesterday has been sealed over, as the housewife seals her glasses of jelly with paper. From the secure regions of the upper air the wild geese send down their discordant message, and far within the wood reverberates the mysterious drum of the partridge. We have all heard this martial performance, but the partridge plays to very select audiences, and he who would see the artist in the act must take a reserved seat and wait till he appears.

One who spends the night alone in the forest will gradually become aware that the air is palpitating with sound. The leaves are rustled by tiny feet, and there are lilliputian squeaks and gibberings. The wood fairies are out and enjoying themselves. The mice emerge from their soft nests under the rocks, the flying squirrels forsake their dormitory in the decayed stub, and the uncanny bat flies about on erratic wing. All the timid inhabitants of the woods are taking advantage of the darkness to ply their trades, and have their frolics. But even now their enemies are not asleep. The owls are on their noiseless rounds; the foxes and the weasels are out foraging, poking their sharp noses into every nook and cranny, following the trail of the chipmunk and deermouse, and sniffing the air with murder in their thoughts. There is a scurry among the leaves, a terrified squeak, and a midnight tragedy has been enacted.

Go where we will, there is no such thing as absolute silence. "Beyond all accountable sound there is always the shadow of a sound," and if our dull sense of hearing is incapable of catching the music of the spheres, we may still derive untold pleasure from learning to listen well. A whispered message may be more precious than one shouted from the housetops.

FLORIDA SHELL HEAPS.

By Scolopax.

No part of our country is more interesting to the geologist than the State of Florida. This interest does not attach from the fossil remains, as they are comparatively few, and scarce worthy of rank in comparison with older sections of the Union. The main interest accrues from the fact that the land is of very recent formation. Perhaps it would be more proper to say that the peninsula is of interest to physical geographers rather than to geologists.

Among the peculiarities of this section no more curious features present themselves for our study than the shell heaps. By this I mean the elevated ridges or mounds of shell formation that one encounters throughout large sections of the State, for it is generally known that the peninsula is almost entirely composed of shells, either solid in a conglomerate or pulverized. These heaps, so far as I am able to learn, are generally near the water's edge, and if of any size are nearly, if not quite, always in a parallel line with the water. Many that I have examined gave the best of evidence of great age, while others were apparently of recent formation. These differences agree in their variations to the several theories regarding their accumulation. These theories, together with observations from careful research, will be presented to the readers, without deductions, but with comments, which may assist in a study.

In several quarters the heaps are so symmetrical in form that the idea prevails that they were built there by the Spaniards at an early day for defensive or offensive purposes. The only evidence that seems at all strong for this theory is found on the shores of Lake Worth. Mr. Allan Heyser, proprietor of Oak Lawn Hotel, found a ten or twelve-pound cannon ball imbedded in the debris on the back or inside of the supposed fort. If this ball had been found in front or imbedded on the front side it might be said to have been fired from the water into the heap, but when found unused behind the fort it may well cause consideration.

Another theory is that the aborigines, or perhaps the ancient and now extinct mound-builders, formed these heaps as fortresses. This theory seems untenable, as at very early times there was small chance of attack by water, and moreover it would seem idle that people of that early age, who at best were only used to bows, arrows and clubs, should build large and strong fortifications. Nevertheless, certain of these walls or ridges have forms which indicate some purpose in their builders, or perhaps remodelers. One nearly symmetrical mound on Indian River slightly north of Micco, Brevoord County, is shaped much like an alligator, with a wall around the entire space; the depression in the inside of the fort being quite level and with a well at one end, as if intended for the enclosed space. This mound, heap, fort or religious place of worship is known in that section as "alligator mound."

Another theory, and the generally accepted one, is that the native Indians of Florida have for ages past gathered on the shores of Indian River, so called, and other lagoons, and held tribal clam bakes. Certain sections were selected in accordance with religious rites, perhaps, or more likely as a matter of convenience, and where the oysters were thickest, and here the noble red men gathered year after year, leaving the empty shells to mark the place where they feasted.

Still another theory, this, too, having rational adherents; a theory, also, which accords with Dame Nature's marvelous workings and stranger freaks: It is claimed that the natural elevations and subsidencies of the edges of the sea shore, and especially on the borders of lagoons separated by a narrow neck of land, have caused this condition, assisted by the action of the waves. To be sure many mounds are found away from the water, often many miles, but even this may be accounted for by those defending this course of reasoning.

These heaps are multitudinous, and it is not unfair to say that if joined together, on Indian River alone, they would cover a distance of ten

miles. Many of them are so low and well covered with scrub palmettos that their presence is not detected unless they are near to the water, when their base is loosened by the waves and their structure exposed. They are nearly all composed of nothing but the shells of the common oysters of Florida, which is, I think, a variety of our common oyster of New York, and though some contain a mixture of bones, it is an exception to find bones numerous; still this scarcity may result from the fact that the bones may be entirely disintegrated and thus hard to find.

These mounds, apparently rising from the water's edge, when on the shore and washed out at their bases by the waves, are sometimes twenty feet high, and one that I measured was quite twenty-three feet tall. This mound, the most perfect in its purity of clean oyster shells and freeness from dirt, is opposite to the pelicans' island below St. Sebastian River. It is over four hundred feet long and from thirty to sixty feet deep, back from the water. It has large palmettos growing upon it, some of which must be nearly a hundred years old. A house is perched on its highest point, twenty feet or so back from the edge of the nearly vertical yet crumbling cliff, and the proprietor has had to put up signs to prevent the curious from undermining the rattling, unstable pile and thereby endangering his house. Several palmettos have succumbed to gravity and settled in wry positions to the water's edge.

In several mounds skeletons have been discovered, thus proving comparatively recent occupancy; but this does not prove that the mounds were made for burial purposes, for perhaps the tribes selected the sites because of their elevation and dryness.

From several of these tumuli beads were taken, which were always found on top. The beads were of glass in no instance, but were of a hard substance resembling stone but quite light.

The reader is left to draw his own conclusions, and we hope to hear from others, and those who have studied on the subject, either in the line of archæology or as regards geology, and Florida's formation in particular.

AT CALICO CAMP.

By Robert Curzon.

Far up among the New Hampshire Hills in a bend of the Cocheco lies Calico Camp, one of my favorite little nooks. Why I ever gave it that name I really can't remember, but probably from some connection in my mind with the cotton mills on the same river. When I am out on one of my long solitary rambles I like to get into these quiet, out of the way corners, and, if they suit me, I stay a few days. Sometimes I visit it again and again, until I feel a sort of ownership and cultivate an acquaintance with all the little wild inhabitants. And Calico Camp, as I have already said, is one of my special favorites.

A boisterous little brook joins the Cocheco here. Its banks are thickly fringed with alders and the higher up you go the more placid it becomes, until just before its source in a cold, hill-surrounded bog it spreads into quite a respectable little pond. This seems to be the home of a family of wood ducks, and I usually lay them under contribution for a supper or two.

The edge of the river as it sweeps around the land is girt with jagged, perpendicular, granite rocks. This ledge crops out again among the hills behind the bog, where it is full of trap veins. Just back from the edge of the river is a good thick wood of white pine with an undergrowth of mountain laurel. In a little hollow among these bushes I made my camp. I first came to it in the evening just before sunset, when the flowers were in bloom. Here in the deep shade of the hills they seemed to positively light up the place. Even after I had caught up my fire and the coffee was being boiled and an occasional flame leaped up, the masses of blossoms sent back a ruddy flash as if smiling to be out of the night beyond. And among the dark stems below the fireflies tripped in their torch dance while the katydid plied his strident little fiddle.

With the early streaks of dawn a concert began that would shame the most accomplished of human musicians. The orchestra of Calico Camp is composed of four different kinds of thrushes. A solo by the wood thrush soon becomes a duet as the olive-backed wakes up ; the tender tones of the hermit are soon woven in with them in an incomparable medley, while the veevy's trill seconds them all and blends with the mass of tender harmony till the sun is well above the eastern hills.

At breakfast time the chickadees and red squirrels generally pay me a visit. Both live harmoniously in an old canoe birch that overhangs the mouth of the creek. But why the squirrels, such mischief makers usually among bird nests, have let this particular family of chickadees alone will always be a mystery t me. There is truce between them, though, an I have seen old mother squirrel cuddling new babies within six inches of the knot hole that seemed almost too full of infant black caps. But she is the plague of the life of an old kingfisher that seems to have taken a particular fancy to one sturdy stub of the old birch that overhangs the shoal water just at the mouth of the brook. No sooner does he spring his rattle here than he is promptly chased away and he can only occupy the coveted spot by stealth and in deep silence.

Up among the pines a pair of sharp skinned hawks have their nest, and all day long there is war between them and the blue jays. The partridges also live up this way too, and I often see the old hen with her agile little chicks about the edges of the laurel patches or in the alders by the brook. It's seldom more than a glimpse, however, before the watchful parent flutters about in well-simulated tameness while the wee ones seem to almost melt away among the leaves and underbrush, so quick is their disappearance. I often find the nest and eggshells in some cosy spot where the delicate *Linnea borealis* and the beautiful striped oxalis fringe it about among the green moss.

I am among the rocks on the edge of the river where I go for my noon-tide swim ; there is a jutting ledge under which a pewee builds. One year, quite late in the season, she laid speckled eggs for the second brood. Though

ological rarities, I was magnanimous enough to leave them to hatch ; I don't like to disturb the birds much close to one of my favorite camps.

Back in the bog is a splendid mass of pitcher plants, and somewhere among them a pair of bitterns have their abiding place. Their hollow voices always resound through the evening air, and about the same time a big rough-legged hawk prowls round here and up and down the brook. This is the favorite time, too, for the muskrats to come out and play, and the gambols of the little ones are a very pretty sight.

Calico Camp is always invaded, after a day or two, by lots of little mice. They are not the common domestic animal of civilized life, but a beautiful white-footed, woodland kind.

Wouldn't you like to visit my little camp, my dear reader? Well you shan't know from me just exactly where it is. I love to think of these places as mine and mine alone, and as I sit on my high stool with the hum of the city life and street sounds all about me, their pictures rise up among the dry columns of the figures in the big ledger until some day the longing for the woods and solitude gets too much for me and I whisk off again. Probably sometime I will tell you about Calico Camp in winter.

PROFESSOR JOE—A STORY OF THE SIOUX.

By Samuel Parker.

[Concluded from the April Number.]

The stranger who had so suddenly put in appearance at the Sioux camp was Joseph Williams, a native of St. Louis, an accomplished taxidermist with a roving disposition inherited from his father, whose life had been passed in the wilderness of the upper Missouri as a fur buyer and by whom the son had been tutored in the Sioux language. While yet a boy at school young Joseph's imagination had been fired by the romantic stories of the wilderness as related by his father, and this, his first expedition, was for the double purpose of preparing and mounting specimens of birds and animals and collecting a supply of Indian relics for a college museum at St. Louis.

Being fluent in the Sioux language it required but a few moments to explain to the Indians the object of his mission.

"My friends," he said, "I am going to remain here by your camp until the leaves on the island timber have turned to red and yellow. You have bows and arrows and can shoot; I want some snowy owls, some eagles and pelicans, and the heads and antlers of deer, elk and antelope. I have many beads, looking-glasses, brass tacks, tobacco and paints, which I will trade with you, and I will buy pipes, war clubs, tomahawks and moccasins." As an evidence of good faith the stranger then distributed gratuitously a liberal quantity of presents among the assembled Indians, the warriors accepting with many friendly "how kuh-lah's" the packages of ochre and Chinese vermilion handed out by the generous white man. The women and girls likewise went into raptures over the tiny vials of perfume, little moon-shaped mirrors and colored beads, while a lusty clashing of jaws by troops of wild-eyed boys and cunning little girls afforded ample testimony to the fact that among this portion of the population spruce gum was largely in the ascendant. The day following his arrival the stranger's tent, a large square structure, loomed white against the background of cedars in a pleasant glade not far distant from the Sioux camp. The warriors brought tomahawks, war clubs and bows, many of which had seen service in the ill-fated battle of the Little Big Horn. The chattering squaws likewise poured upon the counter such an avalanche of decorated pipe-holders, knife-scabbards, moccasins and dolls gay with paint and feathers as warranted an oversupply sufficient for private speculation. Late one smoky evening a band of hunters returned from the vicinity of the Painted Woods, bringing a few travois loads of elk and antelope, deer and feathered specimens innumerable. A beautiful swan, while oaring itself majestically among the reeds and lilies of a prairie lake, had met an untimely fate at the hands of Whistling Elk, who, although somewhat languid in his movements since his famous encounter with ma-to, had accompanied the expedition. The days passed along and summer waned apace leaving "Professor Joe"—for so the woodmen on the island, in view of his skill in mounting specimens, had come to style him—still happy and contented in his canvas dwelling among the trees. Born and reared amid the turmoil of the crowded city, the strange, wild beauty of the primeval wilderness thrilled him with an enthusiasm irresistible and grand; while the Sioux with their plumes and moccasins appeared to him like ornamental figures designed by Nature for the special embellishment of the green forests and rocky, haze-dimmed hills, among which for thousands of moons they had lived, loved and roamed. During the warm voluptuous nights of June every vagrant wind that stirred among the tasseled cedars or softly flapped the curtains of his tent was heavy with the fragrance from an ocean of roses blooming in wild luxuriance in the bottom lands, where the midnight flutes of the arctic tohees accorded sweetly with the tuneful wash of the mighty Missouri. Meanwhile, however, the interior of Professor Joe's tent had undergone a transformation extremely bizarre. Ingeniously disposed on shelves or perches of cedar limbs, an array of owls and

eagles, swans, herons and pelicans stared blankly across to the opposite side upon a motley collection of squatting wolves, standing lynxes and wildcats, and the spreading antlers surmounting the pathetic faces of elk and deer.

To the untutored Indians the business of preparing and mounting the specimens was very wonderful, especially the process of inserting the artificial eyes, and during this part of the performance the interior of Professor Joe's pavilion was thronged with a multitude of warriors and squaws, by all of whom the operation was regarded with grave and studious interest.

But Professor Joe, according to the account of Narcisse Rencounter, from whom, in his little cabin hidden in a thicket, the main facts concerning the experiences of the wandering taxidermist at the Sioux village were gathered, was likewise an adept in the art of drawing, and much given to wandering with sketch book and pencil amid the savage and imposing scenery in the vicinity of the camp.

One midsummer day while shooting grouse Rencounter discovered a letter lying on a bank beside a spring located amid the solitude of the river hills, and which had been indited by Professor Joe to a college friend at St. Louis, but which it appears had been lost by that functionary or inadvertently thrown aside with some waste matter contained in his portfolio. Rencounter, himself an excellent scholar, having been educated at a Catholic school in Canada, was therefore quite capable of perusing the stray epistle, the chirography of which was extremely neat and legible. The upper portion of the first page was embellished with an elegant vignette executed in colors and representing a rugged cedar-crowned ledge with a charming bit of river and sky for a background. On the crest of the ledge, and beneath the overarching canopy of cedars, a winsome Indian maiden, with painted cheeks and picturesque head-dress of green and yellow plumes, stood gazing dreamily at the wandering river.

"Pretty Cloud, by all that's holy!" ejaculated Rencounter, crossing himself with amazement.

"Now, Mr. Professor Joe," he further soliloquized, "between the affair of making love to the belle of a hostile camp of Sioux Indians and the business of stuffing eagles and pelicans, I must take it upon myself to inform you that the latter can certainly be carried on with far less risk of having your topknot drying on a lodge pole one of these days, which, if this be your game, is a catastrophe sure to overtake you."

After this sage observation, which was based on some of his own personal experiences in the field of Indian love making, Rencounter, without so much as "by your leave," proceeded to regale himself with the contents of Professor Joe's letter, which was addressed to Mr. Frederick Lawrence, and read as follows:

DEVIL'S ISLAND, ————, 18—.

DEAR FRED:—With the breezy fragrance of pine branches in my nostrils, and fortified, moreover, by an exhilaration of mind and body such as I never before experienced, I will now redeem my promise and proceed to inform you how the world wags at Devil's Island. Concerning any curiosity you may chance to entertain as to why the title by which his satanic majesty is most familiarly known has been clapped upon this romantic island, I must confess that that is a question which I have not as yet investigated. However, you may be sure that the appellation has been bestowed upon it by the superstitious Indians. Good and evil spirits cut about an equal figure in their geography, but respecting the island I can perceive nothing in its physical aspects that could possibly suggest a title so unmelodious. I frequently annoy Rencounter, a French-Canadian, a sort of hermit who occupies a little cabin not far from my tent, by assuring him that the Indians have informed me that the island is so called from the fact of his own (Rencounter's) close proximity thereto—that previous to his advent it was known as Paradise Island, etc. The Indians are quick to notice any peculiarity in a man's personal make-up, and on this certain peculiarity, whatever it may chance to be, they proceed forthwith to hang the name by which the individual is henceforth to be known by them. Rencounter is the possessor of a huge Napoleonic moustache terminating at the extremities with sharp, slender points. To the simple-minded Indians these wisp-like projections on either side of his face were somehow suggestive of the horns of a catfish, and Rencounter was accordingly given the name of E-hop-e-te, The Fish, and he is never hailed by any other title. By the way, neighbor Rencounter is quite a character, and he is gifted with a pomposity of language sufficient to paralyze a lexicographer. A chopper who has passed several seasons in this region informs me that he was educated at Montreal with a view of becoming a Catholic priest; but, having discovered that the business of pattering *credos* in the wilderness was a rather precarious means of gaining a subsistence, E-hop-e-te has changed his base of operations and stocked his hermitage with a variety of commodities, which are dispensed to the choppers at a profit sufficiently exorbitant to permit the occasional purchase of a demijohn of fire-water—a beverage for which he has a remarkable weakness. It is toward the close of a protracted debauch that E-hop-e-te's bump of veneration becomes the most apparent. The more his oft-repeated potations tend to reduce the con-

tents of his demijohn to a nonentity, the more his spirits droop accordingly, until finally he becomes so mournfully pious that to approach him is simply to invite an extended homily on the widespread evils of dram-drinking, and the utter indifference of the human family in general to matters pertaining to their spiritual welfare, etc.

"And how do you like the wilderness?" I fancy I hear you ask. Language, my dear friend, utterly fails to express my enthusiasm. From the day the good steamer Josephine set me down in this wild retreat life with me has been one long continued dream of romance. In summer at least this is truly an enchanted land. Such charming wood and river wanderings amid the wild magnificence of primeval nature, and such nights of balmy and refreshing slumber as I now enjoy, are blessings which all the mad gaieties of *le beau monde* could never impart. There is one characteristic feature of this wild latitude in summer that, to my mind, is impressively weird and beautiful. For days together the wild and rugged landscape around lies buried in a haunting and delicious atmosphere of smoke, through the purple density of which the sunlight falls in crimson shadows on sleeping hills and forest boughs, while an extraordinary silence, as deep and breathless as the halls of eternity, reigns supreme. Occasionally the pulseless foliage is animated by the cicada's blast, ringing at first high and shrill, then dying away gradually and lovingly into the faintest of spirit-whispers. It is on such preëminent days, when Nature's "prayer hush" is on the world, that fancies vague and exquisite possess me and the burden of existence becomes as light as air. And what, my dear friend, could be sweeter, when earthly cares are forever ended, than a final resting place amid the silence of this smoky wonderland, with the stately volume of the river for my requiem, and alone with the dreams and the dews?

Knowing you to be an admirer of Cooper's Indian stories leads me to imagine that you would likewise be greatly interested in the Sioux; and I am sure that you would be surprised to find how quickly the spirit of mistrustful prejudice which one invariably has laid up against them disappears after a short familiarity with them in their natural haunts. A Sioux warrior, embellished with his original native costume, his brilliant moccasins, his paint and eagle plumes and his barbaric ornaments, when thrown against the romantic background of forests and river crags, presents a spectacle than which Nature, in all her category of human products, affords nowhere a parallel. Among their most noticeable characteristics is the child-like simplicity of their natures, their inherent superstition, their affection or their children, and their yearning love for any special locality from which the encroachments of civilization have been withheld for a sufficient period to lead them to regard it as their home. Their oratory, their legends and fantastic superstitions are colored with a poetic glamor, and their dying dreams are haunted by visions of a spirit world wherein the forests and mountains teem with game and hunger is unknown. A glance at their eventful history can scarcely fail to impress a sympathetic soul with a thrill of compassionate interest; for if there be one thing more than another that exemplifies the pathos of human existence, it is surely the despair of a moribund nation. A few more years and all of the most picturesque and poetic features that characterize these remarkable people will have been lost in the oncoming wave of civilization, but

"Strange sounds of a forgotten tongue
Shall cling to many a crag and cave,
In wash of falling waters sung
Or murmur of the wave.
And oft at midmost hush of night,
Shrill o'er the deep-mouthed cataract's roar,
Shall ring the war cry from the height
That woke the wilds of yore."

The wildest appearing and most elaborately costumed Indian that I have ever before seen arrived here a few evenings ago with the information that the Indians were massing at a point on the Upper Cheyenne, for the purpose of holding a sun dance, one of the most barbarous observances peculiar to the Sioux. The tidings, it appears, were favorably received, for the next morning the courier departed accompanied by a large and gorgeously appareled cavalcade from this place, which, with the exception of the female population and a few old men, leaves the village practically deserted. Notwithstanding, however, traffic still continues lively, for the finest curiosities in my collection are purchased from the women, in the manufacture of which they are exceedingly tasty. Many of the Sioux girls are not only comely, but handsome, with slender, willowy forms, white, even teeth, and small, shapely hands, while their laughter is very soft and musical. During the process of trading at the counter they become as mischievous and garrulous as a family of magpies. The articles most coveted by them are paints, ribbons, musk and fragrant soups.

Apropos of my remark concerning the personal appearance of the Sioux women, there is at the present time in this camp a maiden whose attractive features, I dare say, would captivate your fancy and almost persuade you to adopt a lodge in the wilderness. The vignette picture in my letter page is a faithful likeness of this dusky Venus just as she appeared while standing alone on the river's bank, and which I succeeded in transferring to paper without her knowledge. With a pair of soft, dove-like eyes, two prairie-bronzed cheeks touched faintly with vermilion, a sweeping cataract of blue-black hair and a form as graceful as an antelope's, it may well be imagined that Pretty Cloud, for that is her name, is queen of her forest realm. Thunder Hawk, her father, is quite an interesting old Indian, and I frequently pass an evening in his wigwam, usually taking along some tobacco for the chief and likewise some little trifle for Pretty Cloud, to whom the old warrior seems devotedly attached. Indian girls, however, are invariably timid and reserved in their intercourse with white men during the presence of their own people, who are very watchful and suspicious of any unusual attentions shown them by the whites. But, with the departure of the warriors to the sun dance, the bonds of reserve are broken for the time at least, and I find myself besieged daily by a dusky but extremely merry and mischievous audience, among which Pretty Cloud, hitherto as shy as a wild bird, is now the leading spirit. They delight in slyly appropriating my hat, gloves or cane, and then leading me on a madcap race through the shrubbery to recover them, the while the woodland resounds with their musical laughter, and I discover, moreover, that the frolicsome gnomes are as fleet of foot as antelopes.

Yesterday evening, while sitting alone in my tent and busily employed in preparing an eagle for mounting, a shadow darkened the entrance, and Miss Pretty Cloud stepped within. Advancing timidly to the counter, she deposited thereon a small package, and without a word turned about and glided hastily away in the direction of the camp. Being curious in regard to the contents of the parcel, I proceeded to undo the same, when lo! and behold, a pair of moccasins beautifully and elaborately embroidered, and which, inasmuch as she has since declined to accept anything in payment, were of course tendered expressly as a keepsake. I shall preserve them care-

fully as a pleasant reminder of my summer among the Sioux.

Wild plums and grapes are ripe, and the little "coolies" among the hills fairly teem with grouse. The Indians take a great many channel catfish from the river, and I am literally living on the fat of the land.

But a few weeks more and I hope to see you in person, when I shall be pleased to entertain you with more of my experiences in the land of the Dakotas. Until then I am,

Yours, etc.,

JOSEPH WILLIAMS.

In view of his long familiarity with the customs of the Sioux, Rencounter was quick to perceive that Professor Joe's letter, although couched partly in a light and lively vein, was withal a faithful portrayal of Indian character in their every-day life in the wilderness. Moreover, the pleasant allusions to himself and demijohn he accepted with a spirit of careless unconcern, inasmuch as they, too, were strictly within the bounds of truth. However, he could scarcely repress a sly twinkle of amusement on recalling certain visits made by Professor Joe to his cabin, from which that worthy had retired in a state of mental confusion, produced by the same magic elixir of which Rencounter was purported to be unusually fond.

It was toward the close of September that Professor Joe discovered that the accumulation of Indian curiosities, together with his mounted specimens, had stocked his tent to its utmost capacity, and preparations were accordingly made for his return trip to St. Louis. In hourly expectation of the boat on which he was to embark for home, Professor Joe had one morning taken down his tent, which, together with its contents, he had conveyed to the river's bank. The brief interval of time pending the boat's arrival was employed by Professor Joe in sauntering aimlessly among the river groves enjoying the superb loveliness of the surrounding landscape. It was a glorious October day, and river, wood and hills were steeped in the purple haze of Indian summer. The bilberries hung in blushing clusters on the trees, and long, blood-red streamers from climbing vines were swaying dreamily in the pensive autumn air. The train of solitary musings into which Professor Joe had fallen while strolling along the river was presently disturbed by the loud, hoarse whistle of the approaching steamer, the huge smokestacks of which he now perceived darkly outlined against the bluffs and bearing rapidly down the stream. But while hastening along in the direction of the landing the footsteps of Professor Joe were stayed for a momentary period by the appearance of an apparition in plumes and paint in the form of Pretty Cloud, who had suddenly darted to his side from among the branches of a sheltered covert. That she was unduly agitated was at once apparent to Professor Joe. For a brief moment the dusky maiden stood before him in the path with downcast eyes and heaving bosom, while two bright tear drops rolled down her painted cheeks and splashed upon the folds of the crimson mantle thrown about her shoulders. Just then, however, the clatter of approaching pony hoofs were heard in close proximity, and with a hastily murmured ejaculation in token of farewell, Pretty Cloud disappeared like a startled fawn among the pines. The next moment Whistling Elk, with eager haste, but with eyes and ears intent on nothing beyond the approaching steamboat, galloped quickly by on his way to the landing. The kindly heart of Professor Joe was touched at the expression of romantic tenderness as betrayed by Pretty Cloud, for to him the occurrence was an undreamed of revelation. However, the affair was for the time forgotten amid the bustle and confusion incident to the transferring of his owls and eagles, his wolves, wildcats and mountain lions and other *etcetera* on board the steamer, the consummation of which the mate, with a well-turned expletive selected from an inexhaustible vocabulary, avowed had transformed the craft into a veritable Noah's Ark.

Such were the experiences of Professor Joe, the taxidermist, at Devil's Island, as related to me by Narcisse Rencounter on the night when I shared his hospitality in his little cabin which, as the Indian had truthfully observed, was hidden like a wolf in a thicket.

THE AQUARIUM.

CONDUCTED BY HUGO MULERTT.

[The Editor of this Department will cheerfully answer all queries relative to the conduct of Aquaria.]

WATER LILIES *(Nymphaea)*.

Water lilies have received from time immemorial the very appropriate appellation of Nymphaea, Fairy Goddess of the Water, etc., in allusion to their charming, fairy-like appearance; and although this title was applied to all aquatic plants in common, it was especially applied to the true Nymphaea, from its peculiar manner of growth. But it is always interesting to learn something of the antecedents or genealogy, if you please, of any strange or mystical object first, and we will turn to ancient mythology to learn something of these fairy deities. Ancient mythology, however, is often very indefinite in its delineation of the origin and attributes of some of the fabled deities; or perhaps more properly speaking, the old Greeks and Romans have often adopted the Oriental and African mythology without a full understanding of their supposed attributes, for in all probability the origin of these pleasing tales was Asia or Africa (Egypt).

We find at the head of mythical genealogy stands Chaos, with her four children; next in succession is Earth, first-born of Chaos, also with her four children; then Earth married Heaven, raised a family of seventeen children, whose oldest and most beloved son, Oceanos, takes Tethys, one of the Titans, for his bride; and one of their three thousand daughters (viz., all the lakes, rivers and brooks known to the ancients), Oceanides marrying Jupiter, raised a family of fifty daughters—the Nymphs—who were the titular goddesses or guardians of the sea, lakes, rivers, mountains, dales, groves; in fact, every place known to the ancients was fabled to have one of these fairy Nymphs as their protector, with appropriate titles, to which was dedicated suitable rites and ceremonies for their worship. The Naiad Nymphs were in particular guardians of fresh water rivers, etc., and as such are the special objects of our notice.

The word Nymphaea seems to have originally signified "bride," and was probably derived from the Greek. It was generally applied to married or marriageable young ladies, for the idea of youth was always included. The Naiads are usually represented in works of art as beautiful young maids half draped and with long flowing hair, usually leaning upon an urn from which flows a stream of water. The word Naiad is derived from the Greek verb "to flow," as indicative of the general motion of the water. They were supposed to preside over fresh water fountains, streams, brooks and springs, and to inspire those who drank of its waters with oracular powers and the gift of poetry. They could also restore the sick to health.

Of course, all these mythical fairy tales have a direct bearing upon the religous ideas—or perhaps we should say, the superstitious belief—of the people, for there was nothing at that early date, outside of the Jewish church, that is now recognized as religion. And although we affect to despise these old heathen fables, we still retain their names, and these names alone seem to connect the obscure, fabled past with the present time to such an extent that for a perfect understanding of the subject we must give more detail than simply say, "a Greek or Roman legend." This being our apology for deviating from the proposed subject, we will now dismiss ancient mythology and talk of modern reality.

In all the tropical and temperate portions of the world, particularly in the northern hemisphere, is found a peculiar aquatic plant, with large, roundish or peltate leaves, that float upon the surface of the water, which are among the loveliest products of the floral world. They are, however, by no means new to travelers, or even to science, and have been so often described that it would be almost useless to repeat a description here.

But there are some points of special interest that may not be generally known, that we will notice. Altogether there are about thirty accepted species, five of which are found growing within the limits of the United States.

Nymphaea odorata (Aiton).—This is our common American water lily, and is familiar to all. It has large, orbicular, floating leaves, often six inches in diameter, attached to the stem at near the centre, and cleft from the base to the insertion of the stem. The flowers are white, often shaded more or less with pink; very fragrant; opening with the sun in the morning but closing again about 3 P. M., about five and a half inches in diameter more or less double, or petals arranged in fours in many rows, imbricated so as to cover the whole of the ovary. But of all strange flowers the *N. odorata* are the most interesting to botanists, from the fact of its showing the gradual and perfect graduation of forms from stamens to pistils and thence to sepals.

We find under cultivation the flowers usually last two days in perfection, but after the second day the closed flower sinks gradually down in the water and ripens the seed, the decaying petals still adhering to the ovary. The root-stocks of *N. odorata* are long, roundish and often as large as a man's arm. They make their growth from the end, creeping along the bottom and lie buried in the mud, with from a few inches of water over them, to several feet. Upon cutting the root or leafstems they are found to contain a large amount of milky juice, often farinaceous, and are consequently often used for food.

N. odorata minor (Sims).—This is a rare variety, and may be said to be only a dwarf or stunted variety, growing in shallow water and in cold bogs or sandy soil. The flowers are white and two or three inches in diameter, with leaves from two to five inches broad.

N. tuberosa (Paine).—Very similar to *N. odorata* in general appearance. The leaves reniform, orbicular, about a foot broad and very prominently ribbed; flowers from four and a half to nine inches in diameter; petals broad and blunt, pure white, never pinkish; scentless, or with a faint odor of apples; root-stock bearing tubers often compound which spontaneously detach themselves.

N. odorata rosea.—This is the famous Cape Cod water lily, and the grandest acquisition ever made to our list of hardy Nymphaea. It possesses all the desirable qualities of the white-flowered species—hardiness, freedom of bloom and delicious fragrance, with the added charm of a deep pink color.

N. alba.—This is the native water lily of England and Germany. The flowers are white, the petals broader and more waxy than *N. oderata.* It begins to bloom earlier and remains in bloom longer than our native Nymphaea.

N. coerulea.—The blue lotus of the Nile has large, fragrant, sky-blue flowers; leaves floating, crenate; lobes partly united and becoming peltate.

N. lotus has large white flowers, tinted with pink; sepals red at the margins; leaves strongly toothed and the under side prominently veined; grow in the slow-running streams and rice fields of Egypt.

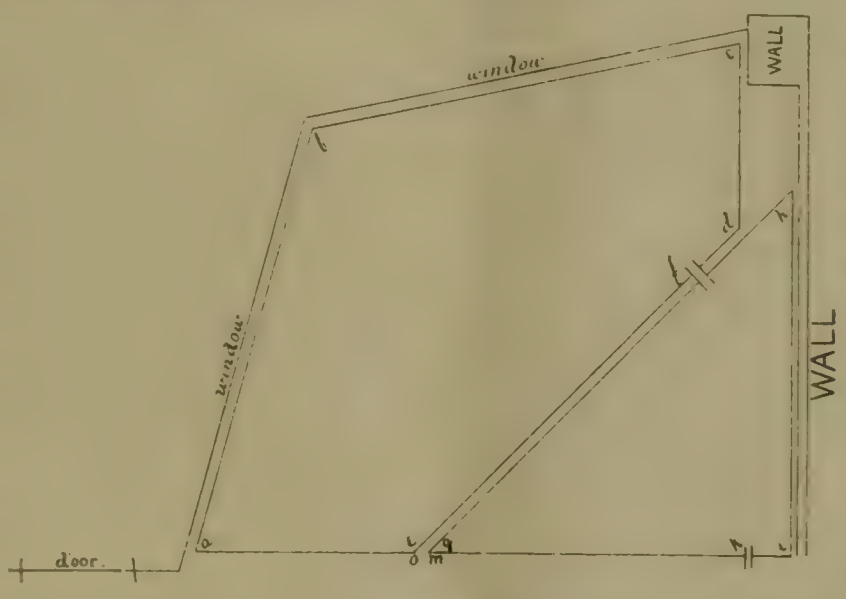
N. edulis has white flowers and contains an abundance of starch in its roots, and is a valuable article of diet in India. This variety, as well as the *dentata*, *rubra*, *devoniensis* and others, are night bloomers (the flowers open after six in the evening and close again in the morning), and supposed to be modified forms of *N. lotus*.

MY AQUARIUM OF BLACK BASS, ETC.

By George Kamper.

Four years ago I built for one of the show windows of my store an aquarium for keeping specimens of the various kinds of fish caught in the waters of our county. It is built to fit the irregular angles of the window, about as follows:

Scale 1-12. Front sides, *ab* and *bc*, are plate glass; back sides, *cd*, *de* and *ea*, and the bottom, are wood, lined with sheet lead. The sides are ten inches high inside and the bottom contains about eleven square feet surface. At *e* the water pipe *m* comes over the top, and under pressure from our city waterworks a steady jet of water is thrown through a very small nozzle down into the tank. The water stands twelve inches deep, making a total of about eighty gallons, and overflows at *f*, four inches below the top of the tank, into the back tank, *ghi*. This back tank fills to a seven-inch depth and then the water passes from the overflow, *k*, down thro' the cellar into the sewer.



When the fish eat there is necessarily some excrement and undigested particles of food, such as minnow bones, claws of crawfish, etc. This offal tends to befoul the water, and if not removed will produce the so-called "aquarium disease." To avoid this filth disease I have covered the bottom of the tank with small rocks and pebbles, between which the sediment gathers and remains until I clean it out. I clean the tank about once a month during the summer season in the following manner: I turn the water pipe *m* to throw the water into the back tank at *g*; catch the fish with a landing net and put them in there also. Then with twelve feet of one-inch rubber hose I siphon the accumulated filth out of the main tank and wash it clean of green slime, etc. Before putting the fish back I clean them also by holding them under the strong jet of inflowing water, which cuts the slime from their bodies and makes the back tank look like a tub full of soapsuds. This cleaning must be done when the fish have empty stomachs, otherwise it will make them vomit, By these means I have succeeded in avoiding the aquarium disease among my fish, and they are in a healthy condition.

The sketch gives you a fair idea of the size and general arrangement of my aquarium, and I will now tell you something about its inhabitants, and a few incidental observations. I will begin with the statement that, excepting one large carp, which remained only forty-eight hours, no fish have ever been in my aquarium that were not caught legitimately with hook and line in public water adjacent to Danville. The first were put there in March, 1887, and the suckers were put there simply to fill up until the bass began to bite. About April 25 of the same year I had replaced the suckers with twelve small-mouthed black bass, weighing from one to three and a half pounds each; three rock bass or goggle-eyes, two bullheads, one small channel catfish and one eel. The two largest bass were a female very heavy with eggs, weighing three and a half pounds, and a male fish a trifle longer but more slender, weighing three and a quarter pounds. The female had been caught in the Vermilion River under the Wabash Railroad bridge, and the male in the North Fork, above the dam. Near the middle of May I noticed that on warm days the male fish would take possession of the centre of the tank and compel all the other fish, except the large female,

to huddle in the corners. The large female appeared to be at liberty to do as she pleased; the two had evidently decided to mate and nest, and the male seemed to do the fighting for both of them. They were a handsome couple, and naturally I was much interested in the probable outcome of their courtship.

On May 20 I was out of the city, remaining away over night, and returned the next morning. As I stepped from the train on to the depot platform the first man I met accosted me with, "George, your fish are all dead," and I heard the same unwelcome news several times before I reached my store, where I found the case as bad as represented. All the bass, the goggle-eyes and the channel catfish, were laid out in a row; every vestige of the color of life had left them; they were pale as ghosts—dead. Standing near them, viewing them with a sad face (he also had learned to love them), and somewhat in fear of my wrath, was my clerk, Willie. To my question, "Willie, how did it happen?" he answered: "Mr. Kamper, I hardly know. When I opened the store this morning the water was only dripping a little and the fish were dead." Further questioning brought the information that, before closing the store the preceding night, Willie had turned down the strong pressure to enable him to draw a cup of water to drink, and he had forgotten to turn it on again. The absence of pressure had permitted a speck of dirt to lodge in the nozzle, and the flow of water stopped entirely. Soon after daybreak the policeman on this beat noticed my fish showing signs of distress, gasping for breath and rolling and tumbling as if in delirium, and also that the water had stopped. He hunted for me at my rooms and at the hotel, but I was not in the city. When Willie came at 7 o'clock life had left all of the fish except the eel and the two bullheads. These, I was told, kept their mouths near the surface, and they survived.

About the middle of May the bass in our rivers begin to nest, and as for that reason I could not immediately stock my aquarium with bass, I filled it temporarily with channel catfish. The catfish were rather unsatisfactory, on account of their habit of huddling together in the darkest corner during the day, feeding only at night after all the lights were turned out and everything was dark and quiet. When bass fishing again began in August, I soon replaced the catfish with a fresh lot of bass, but none were as interesting as the large pair that was killed in the disaster of May 20.

With the approach of winter I decided that the water would be undesirable in my window during the cold weather, and I also needed the show window for holiday goods, etc., therefore about the middle of November I killed the fish, shut off the water and removed the tank. This ended the first year. In March, 1888, I again put my aquarium in the window, turned on the water and filled up with suckers and bullheads until the bass commenced to bite.

By the latter part of April I again had a lot of bass ranging in weight from one and a half to two and a half pounds each, but although some of these were heavy with eggs, I saw no signs of mating or attempting to nest, and in July the fish dropped their spawn, which went to waste.

I feed my fish principally with minnows, of which I bring two or three bucketfulls at a time from the river. At the store I assort them, throwing the largest and choicest into the back tank for future use as bait, and throwing the balance to my fish for feed. After a few months of this practice I noticed that the bass appeared to understand the meaning of the rattling of the minnow buckets, and this set me to experimenting. Though they were at first somewhat timid, the bass soon ceased to fear my hand in the water near them, and before long they boldly took hold of minnows held by me, and forcibly pulled them out of my hand. When they are not hungry, they are of course beyond my control, but if they want something to eat it is different. They will then come to my hand, permit me to chuck them under the chin, and appear to say by looks almost as eloquent as words, "Give me something to eat," and I seldom let them beg in vain.

Of course I felt proud of them, and became so attached to them that I dreaded the approach of winter, for I did not want to kill them, and could not keep them in my window during the winter months. I had plenty of room in my cellar, but how about the food supply?

Could I winter my pets? Still undecided what to do, I noticed that as the water became colder the appetite of my fish diminished, and then it dawned on me that they might live through the winter without food.

On the day before Thanksgiving I moved my aquarium into the cellar, changed the water pipe to supply the same kind of a stream down there, and put the fish into winter quarters. On January 1, 1889, during a period of mild weather, I induced some boys to go to a sheltered bluff facing south and dig some worms. They brought me a can full of choice earthworms, and I went down with them to interview my pets. The fish seemed to be comfortable in the cellar twilight; the slow, regular motions of their fins necessary to maintain their position, and the slight and almost imperceptible movements of their jaws and gill covers in the act of breathing, were the only signs of life about them. I held in front of them some of those long, fat earthworms, curling and twisting, but they would not touch them, though they had the previous summer taken many such out of my hand with evident relish as a change of diet. I even hung a large worm over the snout of one of the fish, but he leisurely shook it off and permitted it to fall to the bottom. Being convinced that the fish would not eat, I ceased to worry about their winter food supply, emptied the worms into the water and left them. The following March I moved the fish upstairs again, finding them all plump and healthy, and the worms still crawling about in the bottom of the tank. As the water became warmer the fish regained their appetite and began to feed, rather slowly at first, but with increasing vigor as spring ripened into summer. The summer of 1889 was a repetition of the preceding one, in so far that the bass had lost their fear of the hand of man, and remained tame and healthy. During that summer I put in with them for a few weeks a channel catfish weighing five pounds. He was a handsome fish, with a small head, and slender, graceful body, beautifully marked with black dots on the pale blue skin, and made a grand fight when I captured him, but the brute had no sense whatever. Any motion throwing a shadow over the water frightened him, and I found that in his fright, rushing about with horns sticking out stiff, he had injured some of my bass. I was compelled to take him out and kill him.

During the winter of 1889 to 1890, I kept twenty bass in the cellar, putting them down earlier than the preceding fall, and before they had entirely stopped feeding; I put with them a batch of minnows, which they ate in the cellar. When I again moved them upstairs in March I found that my tank was very foul, the fish were very slimy, and those that had been horned the preceding summer by the large catfish were very sore in the injured spots. I took the injured ones (four in number) back to the river, where I hope they have found a doctor to heal their wounds. The uninjured ones I washed carefully; with the warm weather they regained their full appetite, and the six largest are in my tank to-day. Last fall I waited until the fish had quit feeding before I put them into the cellar again, and did not attempt to winter so many, and the result is that there is not a mar or blemish on one of them. They are upstairs in my window again, and enumerate as follows:

Three rock bass or goggle-eyes, weighing between four and six ounces each, which I have had about two years. One channel catfish, which I caught in June, 1889, when he weighed one and three-fourths pounds; he now weighs over three pounds, and has lost much of his unreasoning natural fear. Two scale carp, one weighing three-quarters of a pound, which I caught last August, and the other one caught in April, 1889, when it weighed one and a half pounds, but which now weighs three pounds. Last, but not least, ten small-mouthed black bass, six of which are of the lot caught in April, 1888; one has been in my possession since September, 1889, and the other three since October, 1890. The largest one is the two and a half pound fish of the spring of 1888; he has grown very little in length, but considerable in thickness and depth, and now weighs three and a half pounds. The other nine bass weigh from three pounds six ounces down to two and a half pounds, and the aggregate weight of the ten is thirty-one pounds.

You see by above enumeration that I have

not confined my attention strictly to bass, and you can readily understand that under the circumstances a thorough "fish crank" can pick up many odd bits of information on the subject of his hobby.

As my back tank is a very convenient place for fresh-caught fish until I am ready to use them, I always endeavor, when fishing, to keep my catch alive. After landing a fish I string him by carefully putting a string through between the gills and the outer gill cover (never between two red gills), and then out at the mouth, drawing it through slowly, so as not to draw blood from the gills. I tie a separate loop for each fish, so they do not strain each other's gills, and tie them in the water until I am ready to go home. If I am on foot I carry the fish home by the strings, and, if in a conveyance, they are laid down in the bottom of the wagon. When the weather is cool fish may be kept out of water an hour or even longer, and regain their health, but a carry of only fifteen or twenty minutes through a hot summer sun often kills them. Bass are more hardy and able to bear more exposure than the channel catfish. The small wound made by the hook in the hard jaws of a bass scarcely shows the next day, but in the jaws of a channel catfish the hook wound often festers and remains sore for several weeks.

Small-mouthed bass have always been quick to grow accustomed to their changed surroundings; they soon begin to feed, and soon cease to become frightened at unusual motions or shadows, but have always strenuously objected to having a landing net put under them. They permit me, and apparently enjoy to have me rub their backs and sides with a stick, somewhat similar to dogs who like to have their heads scratched.

With large-mouthed bass my experience has been quite different. I have often tried to make one of them a permanent resident in my aquarium, but have not succeeded. They remain wild, refuse to eat, and finally sicken and die. I made my last attempt with a three-pounder last summer. He had not been injured in the catching, had to bear only ten minutes of carrying on a moderately cool day, and arrived at my aquarium without showing any sign of weakness, swimming off as soon as put in the water. I never saw him feed, and at the end of three months he looked so shrunken and miserable that I took him back to the river in disgust, determined not to try any more experiments with large-mouthed bass. Catfish also have been unsatisfactory tenants in my aquarium. The bullheads and the flat-headed marbled catfish have become diseased after six months or a year, probably because they persisted in lying so close to the filth which gathers between the rocks in the bottom, and they had no mud to crawl through to clean themselves. Probably, also, I did not take as much pains to wash and clean them as I did my other fish. Channel catfish have shown no tendency to become diseased (they are not mud rooters), but their wild and unreasoning fear, which causes them on the slightest provocation to rush about with stiff horns, added to their strength and agility, makes them rather dangerous for their neighbors. The one now in my tank was wild all of the first year, but he was not large enough to do any damage. Of pike we have only a few small ones in our river, still I have several times put a pike fifteen inches long into my aquarium. Suckers we have plenty, and I have tried them of all sizes, large and small, but the small-mouthed black bass seem to possess an inveterate hatred against pike and suckers. They swallow either if less than seven inches long, and viciously attack the larger ones, biting them till they die.

Rock bass or goggle-eyes, even if only three inches long, are permitted by their lordly and somewhat vicious neighbors to live in peace. They soon become reconciled to their new quarters, soon begin to feed, and thrive about as well as their messmates, the small-mouthed black bass. Carp are also permitted by the other fish to live undisturbed. Sunfish live all right, but unless they are more than three inches in diameter, their career ends inside of the bass. Eels live in peace and health with their neighbors (I have found the tendency to become diseased only in the bullheads and mud catfish), but they have too much curiosity, and are forever climbing out of the aquarium. Many times have I found them on the floor and

put them back into the water, but invariably their final end has been to climb out at night and die before I found them the next morning. The last eel I had (thirty inches long and two and a half pounds in weight), was probably cured of his roving propensities by being very near the point of death several times before he was found and restored to the water, for he remained in the tank an entire year without climbing out.

One Sunday evening last August I happened to come to the store, and I found quite a crowd collected in front. One of my old pet bass had jumped out and died, lying between the tank and the window. I could not understand it—the bass ought to have known better. The next morning my eel was on the floor, dead. Something was surely wrong, and on investigation I found that a large snapping turtle, which I had temporarily put into the back tank until I was ready to eat him, had managed to climb over into the main tank. How he succeeded I can't imagine, but I could hardly blame the bass and the eel for wanting to avoid the company of the ugly intruder. You may rest assured that I promptly put the big snapper into an iron cage until I was ready to kill him. This summer I intend to make one more attempt to keep an eel.

Last September the owner of a private pond presented me with a carp weighing seven pounds. I put it into the tank, but the brute was sighing for its native mud and would not be contented. It was too clumsy to climb out, but managed to throw water ten feet high, and in less than forty-eight hours it had pounded its tail fin into shreds, knocked most of the skin from the top of its head, and had the general appearance of having been run through a threshing machine. It went from the tank into the bake oven.

During these four years of feeding my fish, I have of course paid some attention to their preferences in food, and their manner of taking it.

For bass, minnows are undoubtedly the great staple food, and of these the larger are preferred to the smaller. Whenever I give them a lot of minnows of various sizes, from two to five inches long, they always pick out the largest ones first, and take the smaller ones only after no larger ones are left. Black bass, rock bass and channel catfish will eat crawfish, but they prefer minnows. I have often found my fish eager after minnows when they ignored crawfish. One day last summer, when my fish had been without food for several days, I brought from the river a six-quart minnow bucket filled solid (without water) with crawfish, and another bucket filled with minnows. I set the bucket with the minnows into the back tank, and dumped the crawfish into the main tank. The bass immediately commenced to feed, but after twenty minutes they had quit entirely, and the bottom of the tank was still swarming with crawfish. I then emptied in the bucketful of minnows (more than a hundred shiners, two or three inches long), and the fish immediately commenced to feed again, making the water fairly boil. Five minutes afterward they had taken all of the minnows, and their bellies were a sight; bass, goggle-eyes and channel catfish, all were stuffed till it seemed their skins would burst.

All of my fish enjoy a few worms occasionally, and during the summer I sometimes catch a lot of grasshoppers, which are always taken quickly by the bass and goggle-eyes.

Last summer some workmen, digging under a coal house in the rear of my store, caught some mice, which I induced them to bring in and throw to my fish. Five of the mice were alive and kicking, and, as soon as they struck the water, each were promptly caught by a bass and swallowed. The sixth mouse had been killed in the catching, but before it had stopped the motion caused from throwing it, a bass had it. The fish held the dead mouse only a second or two, when he spit it out, and it floated lifeless on the surface; none of the fish would or did eat it. A boy once brought me a live sparrow, full-feathered and nearly full-grown, which I threw into the tank. The bird was struggling in the water, and within five seconds from the time it was thrown in, one of the large bass caught it—and he swallowed it, too. The sparrow was a big mouthful for the bass, but slowly and gradually I saw the tail feathers disappear, and finally I could see a large lump in the body of the fish.

The capacity of the stomach of a fish is won-

derful. My oldest bass one day came to my hand seventeen consecutive times, taking and swallowing a three-inch shiner each time, before he was willing to stay back and give the other fish a chance. Sometimes, when their stomachs are filled so they can hold no more, the bass continue to catch minnows, squeeze and kill them, and spit them out. What fisherman of any considerable experience in fishing with bait for small-mouthed black bass, has not been tantalized by having run after run, when the bass simply squeezed and killed his minnows and then dropped them? And when this tiger spirit possesses the fish, what can equal the satisfaction that the fisherman feels when he beats the bass at his own game, and captures him by spinning a dead minnow? Spinning, not with a gang of a thousand hooks, or six hooks, or three hooks, but with a plain, single Sproat hook on a single gut leader. But I am digressing from the subject of "My Aquarium."

In August, 1889, I was attacked with sickness, and for four weeks I was unable to go after feed for my pets. Some of my friends went several times, but there were ten days when my fish had received nothing to eat, and they were ravenous. They certainly were hungry enough to eat fresh meat if they could be made to eat it at any time, so I tried them, and threw in some pieces of fresh beef. As fast as the pieces of beef struck the water they grabbed for it like a pack of hungry wolves. Every bass in the tank snatched a piece of beef, and every one of them spit it out again. The bass, when hungry, appear to be willing to swallow anything that wriggles, but they certainly refuse to swallow anything that does not show some signs of life.

My carp was neglected during the summer of 1889, and as he had to sustain life as best he could, he has learned to eat minnows. He readily takes small minnows, if killed or crippled so he can catch them. He increased very little in size during 1889, but last summer I fed him bread, and then I noticed a steady growth. The carp is a great forager, always on the move, picking up bits of food, but he does not stuff himself as full as the others do. The channel catfish also likes bread, and while feeding the catfish and carp last summer, I found that they can smell the bread. After first noticing this, I experimented a great many times by quietly dropping bread, kneaded into balls to make it sink, into one corner, when both fish were four or five feet away, with heads turned in the opposite direction. After the bread had been on the bottom a few seconds, the catfish and carp would suddenly turn, swim directly to the bread, and begin to feed on it. They could not have seen me drop the bread and must be able to smell it.

While the channel catfish are fond of and are expert in catching live minnows and crawfish, they are almost omniverous, and will also eat beef, liver, bread, corn, mussels or fresh water clams, worms, and in fact anything that has not become stale and putrid.

According to my experience the bass, channel catfish and carp eat practically nothing when the temperature of the water is near the freezing point; their appetite increases or diminishes as the water becomes warmer or colder, and during the heat of summer they consume enormous quantities of food. A bass fresh from the river in the spring tastes quite different from one equally fresh from the river in the fall, and I have noticed in cleaning fish, that in April, when the scales are scraped from a bass the fish is clean, but in early November, when the water is fully as cold as it was in April, slime continues to ooze out of the fish after the scales are scraped off, and after repeated scrapings this slime still comes. I have often thought that possibly this slime or oil, which permeates the entire body of the bass after the summer period of strong feeding, but is absent after the winter's period of fasting, is the surplus vital power stored up during the feeding time, which sustains the fish during their periods of fasting.

My aquarium has been for myself and friends a source of much interest and pleasure, and if any brother angler wants to try the experiment, I shall be pleased to give him further information about details for building and managing a similar one.

NOTES AND QUERIES.

[Under this Department Heading queries relative to all branches of Natural History will be answered.]

A Spider Whirling a Fly.

On a bright summer afternoon of last season while lazily resting on the porch in the warm atmosphere, I observed a fly suddenly stop, flutter and struggle, apparently in mid air. This was soon explained by a little black and brown spider, a shade larger than the fly, darting down from a beam overhead, perpendicularly above the fly. Reaching the latter he

was but a moment in doing whatever he did to secure his prey, and he then ran nimbly up his single cord, which I found, although it was scarcely perceptible, stretched taut from the beam above to a cross rail of fancy wor . below.

The spider ascended about eighteen inches above the fly, then quickly turned head downward, taking hold of the line with its forelegs, as a child would a jumping rope, and with a swaying motion the then struggling fly began to be swung around something like a button would be in the centre of a string held by both hands and rapidly turned by a circular motion. The speed was so rapid that by the time it had reached a circuit of about four inches in diameter the fly could scarcely be discerned. In about a minute its operation ceased and the fly was quiet.

I then found on examination that the fly was still alive, and I felt moved to try if I could secure its freedom. Taking it carefully from the web line—no doubt to the disgust of the spider—I found under the magnifying glass that every leg was closely tied together in the same manner as farmers formerly tied the feet of calves together when taking them to market in the bottom of their wagons. Taking a needle I tried to release the legs, but the work of the spider was too well done, and the fly soon expired. Did anyone ever witness such a mode of a spider securing its game?

W. M. Kohl.

The Tame Crow.

One of the first pets I ever owned was a crow. He was given to me in a crippled condition, and I nursed him patiently for some weeks until he was able to look out for himself pretty well. He always limped and never could fly, but passed most of his time between getting into mischief and escaping punishment, for both of which he showed an immense amount of talent. He slept in the barn, and one cold night in winter he failed to go in to his usual roost, and froze to death in the snow outside the door.

Crows make very amusing pets for any one who can put up with their innate spirit of deviltry, and besides that they can be taught to talk more distinctly than most parrots. It is a common idea among the country people that they will not talk unless their tongues are cut at a certain tender age. Be that as it may, I have heard crows talk excellently that never had their tongues cut, and some whose tongues are cut never will talk at all. I always take my chances without cutting, and out of nearly a dozen that I have owned only two proved devoid of a bump of language.

To be sure of having a good, affectionate

crow, take him from the nest as soon after hatching as you can find him. If it is the first of the brood hatched, all the better. How are you to tell that? Why, if you find one baby crow and four eggs in the nest, does not that settle the question beyond dispute? Name him as soon as you get home. It is a good plan to have a family consultation on this subject, for a rechristening is fatal to the proper education of your callow charge. Always call him by name whenever you feed him. He will learn his name before he knows what feathers are, and respond to it whenever he hears it uttered. Feed, until half fledged, on meal and water—regular "chicken dough"—and if any "chicken sicknesses" come on consult the "chicken doctor." In other words, the young crow must be raised on about the same diet as a young chicken. Feed plenty and feed often. A crow's nest is the best thing to keep him in during his infantile days. If you haven't one make a substitute. As he grows in strength and is able to travel about a little he needs more variety in his food, but be careful he does not swallow anything that is very salt. Dump a handful of gravel down his mouth occasionally, and give him minnows and frogs once in a while. Swallowing his first live frog seems to give a young crow a most agreeable new sensation. Do not be in any hurry about making him bathe. He will wash himself whenever it is necessary, and if taken and plunged into cold water while the pin feathers are full of blood, it may cause him to literally "catch his death o' cold." As soon as he is well on the wing his language lessons should begin. Shut him up in a darkened room when well fed, and begin by whispering the word or phrase you wish him to learn. If he seems to be listening repeat it a little louder, and continue until he either grows restless or goes to sleep. It will be but a few minutes. Repeat the same lesson and nothing else every time you visit him or pass within hearing for a week or ten days, and if your crow don't talk in that time he probably never will. Generally they will begin to practice to themselves the first or second day of their imprisonment, but once a word or phrase is learned others will quickly follow. If really talented, you can make your crow appear to answer a question. For instance, call his name gently and add *what* in a loud, emphatic tone. Soon, when his name is called, he will respond *what* with just the same emphasis and inflection that he has heard you give. Then, again, if you say "It's dinner time" whenever you feed him, some day he will walk into the house hungry and gravely announce, "It's dinner time."

As he grows in years and knowledge your crow will develop a variety of thievish and amusing tricks too numerous to mention. He will cultivate the most friendly acquaintance with some people and show an unaccountable animosity toward others. He will attend you part way whenever you leave home, and, if your hours of return are regular, will probably meet you at the same spot and welcome you exuberantly. Every time he fails to do so look for him at once; he will either be in some utterly entrancing bit of mischief or else dead.

Robert Curzon.

A Dead Bird.

During the night a little bird crept into my office over one of the windows. When I came down it was wild and frightened, and flew against the panes violently. I kept the door open as long as was possible on a cold morning, but it could not seem to find it. During the day it grew less frightened, and sometimes lighted on my desk. I sprinkled some cracker for it, which it ate, stopping often to look at me with bright eyes. Toward evening it grew so tame that it would eat from my hand, and let me caress it. I thought to keep it for a pet, but the next morning it was dead. As I looked upon the feathered nothing before me I wondered what had become of the life it was so full of yesterday, a force so powerful that I sometimes feared for the window panes. Science tells us that nothing is ever lost; the bird's life was something, hence it must still exist somewhere. That the life force is not tangible, something to be touched and examined with the microscope, makes it none the less enduring. Other elements of Nature, whose indestructibility we do not question, are equally intangible. The life of this bird, then, still exists. Does it retain its individuality or has it once

more become a part of some great reservoir of the life essence: who knows?

Albert Bigelow Paine.

A Remarkable Fig Tree.

At the drug store of Mr. J. M. Sprague in St. Paul, Minn., there is a thrifty fig tree four years old and perhaps five feet high, which came up spontaneously in a tub which contained an oleander. The only way in which its voluntary appearance is accounted for is that it grew from seeds of figs which had been fed to a canary whose cage hung over the tub. But the most perplexing part of the problem rests on the fact that the figs were preserved. Will seeds of preserved figs retain their germinating properties? Sometimes, perhaps.

The Aristocratic Malamauk.

Referring to a quotation from Mr. R. H. Strother's "Fishing Adventures on the Newfoundland Banks," published in *Harper's Magazine* in 1861, wherein several kinds of sea birds are mentioned, including "roaches" and "the aristocratic-looking malamauk," we have Prof. Elliot Cones' authority for saying that "roaches" are "rotchies" misspelled. The bird is the least auk (*Alle alle* or *Alle nigricans*). "Malamauk" is the fulmar petrel (*Fulmarus glacialis*) misspelled. Proper spelling is "mallemuck." *Hagdens* are the petrels or shearwaters of the genus *Puffinus*, as the common hagden (*P. major*), the greater shearwater, and the black hagden (*P. fuleginosus*), the sooty shearwater. What are "noodles" I don't exactly know, unless they are fellows who can't spell. Very likely he means murres or foolish guillemots (*Lomvia troile*).

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From Fry to Yearlings.

We had an inquiry some time ago as to the best method of keeping trout fry until they became yearlings, and being anxious to supplement our own experience with that of Monroe A. Green, superintendent of the New York hatchery, we wrote him on the subject and now give his response:

"I think the fry will do better if you could screen some place where there is plenty of vegetable matter. They would get more natural food and do better than you can do for them in troughs. It is a pretty nice thing to raise fish up to yearlings. They have to be fed six or eight times a day, and the troughs cleaned out every day or the water will get foul. We start our fry in troughs fifteen feet long, seven inches deep, fourteen and a half inches wide, with gravelly bottom, until they are about two months old. Then we transfer them to a pond thirty feet long, three feet wide, with gravelly bottom, covered over with trap doors, which we close up nights to keep the rats and minks out; and it takes constant care to raise them. I keep one man that takes care of them, and he is busy all the time."

Sundry Notes.

Many natural history writers talk very eloquently in defence of the hawks, and assert that these birds of flesh-eating habits are of more benefit to farmers than they have the credit of being. It is true that most all kinds of hawks do eat worthless vermin, but this is small recomprise to the mischief these pirates do in destroying all kinds of useful and beautiful birds. This subject has been pretty thoroughly discussed, and the moral is substantially against the *raptores*. For years I have been a pretty close observer of the nature and habits of wild animals and birds, and I have never been able to discover any evidence why we should protect the hawks. What every sportsman should do is to keep up an incessant warfare against all enemies of our game birds and birds of sweet song and beautiful plumage. Hawks of all kinds, the house sparrow, skunks, minks, weasels and coons should receive no mercy.

I think there is a great over estimation in

regard to the rate of flight attributed to birds and wild fowl. While traveling on a Santa Fe railway train in this State recently, an event came under my observation that enlightened me somewhat. A flock of thirty or forty mallard ducks kept flying along parallel to our train for several miles, and their rates of travel and our rate were exactly the same. The day was comparatively calm, and the ducks had a fair chance to display their ability of flight. Our train was running at the rate of thirty miles per hour, hence the great rate of flight credited to this class of ducks I deem is largely imaginary.

—

What is the use of writing and talking about being careful in the handling and use of firearms? Here is a sportsman telling in a sporting journal about how his gun was discharged while being pushed under a barb wire fence, and the muzzle of the gun directed toward him! Shouldn't we quit this subject when one of our own men will go and violate reason by allowing his gun at full cock to be pointed toward his person? But then we draw consolation from the statement of a scientific writer who states that we all are at times insane.

—

A writer in *Sports Afield* speaks very firmly against Sunday shooting. There is no defense for anyone going forth on the Sabbath and violating law and order by the use of firearms. No other practice is so far reaching and flagrant than this. People in general respect the Sabbath and want it reversed as a time of devotion and rest, hence we are trespassing upon the liberty and peace of others by shooting on this day. Let the practice be discouraged and frowned down by true sportsmen everywhere.

Jasper Blines.

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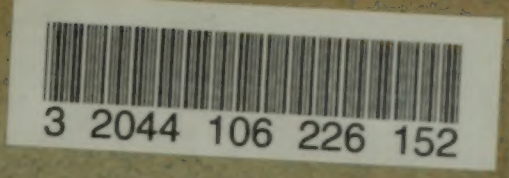
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